Hard Bargaining on the Hard Drive: Gender in the Music Technology Classroom

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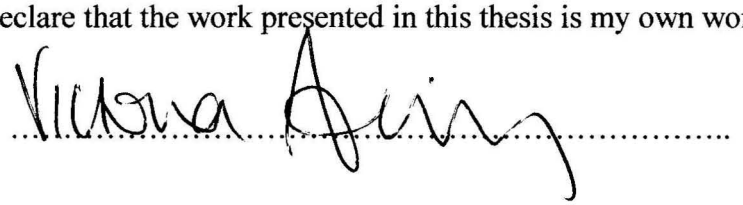
ABSTRACT

This thesis examines the construction of gender identity in cohorts of 15-18 year old boys and girls in relation to music composition and digital technology. The thesis is a response to what I perceive as a strong deterministic trend in the recent technology in music education literature that ignores the socially constructed nature of computers and computer use. By placing my discussion of music technology within the wider framework of gender and the sociology of technology studies, I critically explore the processes by which Information and Communication Technologies (ICTs) have become gendered, in their material use, their symbolic meanings and their ideological function. Through this lens, I examine how these processes underpin the construction of gender and gender relations vis-à-vis technology and their reproduction in the music classroom. Throughout this thesis I have viewed technology as a social practice of which gender is an integral part, highlighting the social embeddedness of technology that posits technology and society as mutually constitutive. I argue that 'symbolic masculinity' and 'material men' retain their hold on technological artefacts, expertise and knowledge. As such, gender-technology relations are constituted in the dominant discourses and practices of technology and have a profound effect on the ways adolescents compose music when using digital technology and on the construction of gendered identities in the technologized music classroom.

I declare that the work presented in this thesis is my own work.



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Contents

Key to transcripts

[*text*]	Background information
[...]	extracts edited out of transcript
...	pause

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CHAPTER 1: INTRODUCTION

1.1 Background and Rationale

In recent years, schools have seen an enormous increase in the use of Information and Communications Technology (ICT) in all areas of the curriculum, not least in the music classroom. Since its introduction into the General Certificate of Secondary Education (GCSE)[1] Music syllabus in 1987, composition has become a core element of the National Curriculum for Music (which sets national standards for what students should learn) in England and Wales. With greater emphasis placed on the role of composition in the classroom many schools are now making considerable financial investment in computers and music software for this purpose[2] In fact, for pupils aged 4-14, the use of ICT is now a statutory requirement in schools for all subject areas (with the exception of Physical Education). With regard to music, the National Curriculum states that the use of ICT helps pupils learn by supporting the development of musical skills, knowledge and understanding, acting as a tool and a distinctive medium for musical expression.[3]

The National Curriculum cites a range of technologies for use in music composition that help pupils capture, manipulate and combine sounds in order to create melodies, make harmonies and develop rhythmic ideas within a range of musical styles. These include mini-disk recorders, electronic keyboards, computers used with software such as Musical Instrument Digital Interface (MIDI) sequencing programs or with notational programs. MIDI is a digital computer language used to transmit information between electronic instruments and

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[1] The General Certificate in Secondary Education is taken in the final year of compulsory schooling at 16.

[2] This thesis concentrates on computer music technology specifically used for composition although I am aware that computer technology can also be used for other aspects of the curriculum such as theory, and listening and appraising for example (see Ho, 2001; 2004; Pegley, 2000)

[3] Information from the National Curriculum website: www.ncaction.org.uk

computers. For example, it allows a keyboard player to play several instruments from a single keyboard acting as a 'virtual orchestra' (White, 2002), each instrument of which can be recorded and played back with a specific sound. This information is stored digitally in the computer and the sounds can then be manipulated in terms of pitch, volume and duration, for example. In addition, MIDI has a wide range of controllers (via pedals and performance wheels for example) that enable the composer to add expressive features such as vibrato to emulate the sound of an acoustic instrument such as a violin. Representations of the score (showing the arrangement of instruments and voices) appear both graphically and via notation. The graphical interface enables audio files to be moved within the mixing environment and is a feature of a number of software packages such as ProTools, Logic Audio and Cubase (see Glossary). In Cubase, for example, these audio files appear as abstract coloured bars in the 'arrange window' but can also be viewed and manipulated via conventional notation using the 'score edit' window. When using notational music software, on the other hand, notes are entered via the mouse or keyboard directly on to the music stave producing professional-looking scores. Although notes can be changed regarding their position on the stave or their duration, unlike with sequencing software, the sound of the note cannot be manipulated once inputted. It should perhaps be pointed out that the software used in educational settings is not designed specifically for educational use, the impetus for its development often emanating from the professional music world, which is then transported directly into an educational setting.

Ostensibly, the benefits of this increased technologization might appear unequivocal but as Pitts (2000) points out, the level of debate within music education has been minimal in comparison to its level of use. Much of the current literature in music education focuses on pedagogical issues, educational outcomes and the role of ICT in raising standards (Phillips and Pearson, 1997; Busen-Smith, 1999; Mills and Murray, 2000; Savage and Challis, 2001; 2002; Pitts and Kwami, 2002). This literature appears to assume that, with sufficient access to both the

computer and the requisite knowledge of music software, all pupils will benefit from engaging with music technologies when composing and will wish to do so. However, this ignores the socially constructed nature of computers and computer use, which renders the current rhetoric lauding the 'democratizing' potential of computers somewhat inadequate and alarmingly naïve. By referring to educational technology as a 'tool' (Bromley and Apple, 1998) we lose sight of the fact that, not only are tools themselves never neutral, but technologies are *systems* which involves complex language structures and social structures (Hatfield, 2000). We surely cannot talk about 'educational technologies' as mere 'things' devoid of any form of socio-cultural context because this fails to capture the complexities of the social 'embeddedness' of technology in which human choices are involved in producing the dynamics and direction of technological development (May, 2003).

Early discussions about these new technologies in music education did encompass the gender implications of this 'tool' (Comber et al, 1993; Caputo, 1994; Comber et al, 1997, Pegley, 2000), but there appears to be a shift away from these concerns as recent research rarely impinges on these social aspects. This is of particular concern when we note that music technology rarely attracts girls but is said to be a positive benefit for male students (Comber et al, 1993; Colley et al, 1997; Green, 1997; Armstrong, 2001; Byrne and MacDonald, 2002). Recent Edexcel GCSE[4] exam statistics reveal the extent of this gender differential. In 2003, of the 715 candidates taking Computing, only 107 (17.5%) were females. Although the uptake of Music Technology 'A' Level[5] has increased by some 27% in the last three years, there are still far fewer girls than boys taking this subject – in 2003, of the 1837 students who took the exam, only 391 (21%) were female. In Whistlecroft's (2000) research into gender and music technology undergraduate degrees women make up only about 18.5% of the staff.[6] In

[4] One of the three main examining bodies in the UK.
[5] Advanced Level post-compulsory examination usually taken at 16+ in preparation for University entrance in England and Wales.
[6] I am unable to find out any information about the current gender balance of students taking music technology courses within Higher Education but I do not think it is unreasonable to speculate that there would be fewer female students.

McCartney's study of undergraduate female electroacoustic composers in Canada, she found women were often in the minority and their experiences could often be very negative as Wende Bartley from McGill University observed:

> I didn't know anything about computers when I started... I was in a class with eleven men, and they all seemed to be really hip to what was going on. There was a strong air of aggression in the class – probably all blustering, since I doubt that many of them knew much about computers either... Somehow I survived that environment and learnt by spending hours in the studio...
>
> (cited in McCartney, 1995b: 8-9)

The situation in education and music technology mirrors the well-documented differential in girls' and boys' computer use within other educational settings (Kiesler et al, 1985; Cully, 1988; Bromley and Apple, 1998; Clegg, 2001; Stepulevage, 2001; Colley and Comber, 2003). Males are often viewed as more 'expert' users than females and have greater influence in shaping the culture of computer use within the classroom:

> The dominant discourse in computing is shaped by social practices which have institutionalized the power of experts, mostly male, to define what counts as computing in education...these ideologies in turn shape the climate which women have to negotiate.
>
> (Clegg, 2001: 308)

Although one might assume that these new educational technologies might be unencumbered with the 'old baggage' of gendered social relations it is important to remember that these new technologies are used and developed within existing social spaces that are always-already delineated along gender lines. Consequently, new digital technologies often reproduce and reinforce these existing gender

hierarchies. As Faulkner (2001: 79) has pointed out, nearly two decades of government initiatives to get more girls and women into the traditionally male-dominated areas of science and technology have been unsuccessful because there has been a failure 'to critically examine the ways in which technology...gets gendered in the eyes of would-be technologists'.

Within current educational policy there appears to be an uncritical assumption that 'all ICT is good ICT' – the learner her/himself as a socially constituted subject warrants little or no attention. A recent mission statement from the Department for Education and Skills states:

> The ICT in schools Divisional mission is to help all children achieve their full potential by supporting every school to become a centre of excellence in the use of ICT for teaching and learning and for whole school improvement.
>
> (DfES, 2003)

Inherent within this statement are a number of assumptions about the role of ICT and the benefits it brings to the classroom. There appears to be an educational certainty that children will achieve more because they have access to and use ICT. Statements such as these also presume that all pupils (and teachers) will want to engage with ICT and brooks no dissent by its final statement that ICT facilitated learning will lead to 'whole school improvement'.

Government documents and statements use similar technocratic language in their construction of the child computer user. The British MP Kenneth Baker said in 1983:

> [Children] are my most devoted fellow missionaries. They are keen, willing, and rapidly becoming expert. It is a children's crusade that is leading us into the Information Technology Revolution.
>
> (cited by Haddon and Skinner, 1991: 438).

As Moran-Ellis and Cooper (2000) note, this type of simplistic formulation underpins much of the current UK Government policy regarding ICT and educational policies with its focus on computer literacy and access. As they go on so say 'the fundamental flaw in such claims derives from the decontexualising... of ICT from cultural and social relationships' (ibid: 4).

This thesis ultimately holds on to Raymond Williams' (1981: 227) assertion that '[A] technology is always, in a full sense, social'. The take-up and use of technologies are shaped by the social relations of the world into which they enter and, as such, are bound up with issues of power, authority and forms of control. Questions about who developed the technology, for what purposes, in whose interests and with what consequences draw our attention to the powerful social structures at play in technological spheres. Williams (ibid: 227) calls technology 'a relationship', stating that it is 'necessarily in complex and variable connection with other social relations and institutions'. This argument frames the theoretical position I have taken throughout this thesis in my examination of technology and composition in the music classroom as it relates to the socially constructed category of gender; the articulation between masculinity and technology being one of the ways that gendered social relations come to be embedded in the social processes of technology. While it would be unwise to imply that technologies are inherently masculine, I do suggest that both the continuing *material* and *symbolic* associations of technology with men and masculinity contribute to the perception of women as less able and less interested in all things technological. As Turkle (1984) notes, it is not that computers contain an inherent gender bias but it is the culture surrounding them which produces socialized expectations of male and female behaviours and attitudes towards computers. This framework defies the kind of simplistic treatments in which technology is presented as either a product of male interests or as a 'neutral tool' because it obliges us 'to view gender *as an integral part* of the social shaping of technology' (Faulkner, 2001:90).

In summary, this thesis is fuelled by the concern that, by failing to engage with the socio-cultural contexts of technological use, we will continue to present an unproblematic picture of technology in the music classroom which fails to accurately reflect the social practices and experiences of young male and female composers and also overlooks the social reproductive effects of the classroom vis-à-vis gender relations. I aim to explore the cultural and structural networks in which adolescents' music compositional experiences are situated, and problematize what Woolgar (2002: 8) has critically termed 'the discourse of the definite', seeking to understand how gendered discourses about technology take hold and flourish in this educational setting.

Such a perspective helps uncover 'that what we take to be the 'truth' is not an eternal and unchangeable fact, but a construction brought about in the dialectical interplay between the historical processes of society's reproduction and the individual's formation of identity' (Green, 1997:4). Discourse 'constructs, defines and produces objects of knowledge in an intelligible way, while at the same time excluding other ways of reasoning as unintelligible' (Barker, 2000: 56). It shapes how we understand and act within the world and comes to represent 'truths' for those who have the power to construct such definitions and for those who are oppressed by them. The concept of discourse signals the inescapably political contexts in which we speak and work. However, discourse is not a passive construct and it is this active construction that holds the possibility for change. As Green (1997: 5) notes, although some of the dominant discourses on music may be accepted as 'common sense' by many, 'others are subservient, or articulate alternative perspectives'. As discourses jostle and compete for dominance, there will always be the possibility for resistance and this offers the potential for new discourses and new meanings to be produced that challenge existing powerful discourses about gender and music.

1.2 Gendering Music, Gendering Technologies

Parallels are particularly evident between women's musical compositions and women's contributions to technology both of which have been denigrated and positioned in opposition to the contributions of their male counterparts. Furthermore, both have been historically and socially constructed along similar lines with their focus on technical knowledge, expertise, rationality and mental logic, attributes which supposedly characterize men and masculinity. A prolific period of feminist writing about music in the late 1980s and 1990s drew attention to some critical issues surrounding the subordination and marginalization of women's music (Shepherd, 1987; McClary, 1991; Solie, 1993; Citron, 1993; Cook and Tsou, 1994; Jezic, 1994; Halstead, 1997)[7]. Presenting powerful arguments about how gender ideologies were constructed and maintained through musical practices, these texts acted as a long-awaited corrective to the hitherto unchallenged supremacy of hegemonic masculinity that underpinned discourses about music.

Within Western thought, the dualisms that construct the oppositional male/female, mind/body, reason/emotion, culture/nature split reproduce a gendered discourse that polarizes masculinity and femininity and we construct musical experiences and meanings through this gendered lens. Green (1997) argues that there are two distinct aspects of musical meaning, the first of which lies within the organization and conventional inter-relationships of the musical materials. These *inherent* musical meanings are part of the listener's learnt understandings of how musical materials relate to each other. In addition, the listener also brings other experiences to bear on the music such as their own cultural and social position or perception of the performer (such as appropriate mode of dress or their gender, for example). These *delineated* meanings operate dialectically with music's inherent meanings and, whether consciously or not, our listening experiences are never devoid of these meanings. Green argues that when we see a woman performing

[7] Dibben (2002) provides a useful overview of some of these issues.

or listen to the work of a female composer her femininity becomes part of the music's delineations. However, whereas the female singer affirms her femininity through the perceived alliance of her sound with her body, devoid of the need to control or employ external forms of technology, the female composer challenges patriarchal notions of femininity. In order to create the technical object (music), the composer must have technical knowledge of instruments and harmony in order to create the musical work and so 'composition requires knowledge and control of technology and technique' leading Green to suggest that composition becomes a 'metaphorical display of the mind' (ibid: 84). Therefore, 'part of the music's delineation includes the notion of the mind behind the music, and part of the notion of mind is that it is masculine' (ibid: 88). Therefore the woman composer's 'metaphorical, delineated display of mind conflicts with her natural submission to her body' (ibid: 88). Citron (1993) also argues that the male appropriation of creativity relies on this ideology that links creativity to the mental. This may appear contrary to how we perceive the arts as they are understood as dealing with emotions; emotions grounded in the natural body and thus 'feminized'. As such, 'feminine emotion' must be supplanted by the 'rational' masculine mind; a rational knowledge that transcends and subordinates the 'feminine' emotions. However, although the male creative 'genius' is allowed to take on these 'feminised' attributes, these attributes, when applied to females, are not accorded the same status (Battersby, 1989).

In similar ways, the sociology of technology studies has also highlighted the gendered discourse that underpins discussions about masculinity, science and technology which Murray (1993) suggests is not surprising given masculinity's attempt to define itself by its monopoly over the control of reason, logic and objectivity. He further argues that technology is the core domain of socially constructed masculinity and acts as a 'boundary marker'; that is, if it is technological it must be masculine, and therefore plays an important role in constructing male identity. It has been argued that technology is never neutral but is always already actively imbued with power of one sort or another; an important

consideration when we note that women are more traditionally users and consumers than designers or producers of technology (Berg, 1994). Game and Pringle (1984) suggest that it is necessary for men to maintain the 'mystification of machines' in order to preserve not only male jobs but the symbolic association of men's work with skill. Thus, men are able to 'represent the power of the machine as theirs and experience themselves as having "technical" expertise... the machine symbolizes masculinity and enables them to live out fantasies about power and domination which in turn reproduce this connection' (ibid: 36).

Traditionally, music, and particularly some realms of music performance, were viewed as a feminine domain although composition is usually associated with masculinity. Consequently, with the introduction of technology, also traditionally perceived as a masculine domain, another layer of symbolic masculinity is added to an already gendered music classroom where teachers perceive boys as having greater 'natural' ability for both technology (Comber et al, 1993; Caputo, 1994; Colley et al, 1997) and composition (Green, 1997). Gendered ideologies within Western art music continue to inform notions of what constitutes a 'composer' and this composer is invariably male. Consequently, just as technology and technological use are constructed around their symbolic associations with masculinity, so has composition maintained symbolic associations with masculinity through very similar processes. As such, the continued gendering of technology and composition presents a much more complicated picture of music technologies and their use in the classroom than is often acknowledged.

1.2.1 Classroom Practices and Gender

Schools act as key sites in the construction and formation of gender (as in the culturally determined characteristics attached to being male and female). As the examination of the gendered cultures of the classroom is integral to my thesis, it is necessary to consider how schools police the boundaries of what constitutes 'appropriate' behaviours and expectations for males and females based on

'common-sense' notions about society and the role of different groups within it. Early studies in gender and education focused on the inequities found in schools that positioned boys and girls differently, often to the detriment of the girls. By revealing this 'hidden curriculum', researchers found that boys often exerted more control over the conversation, interrupted more and often dominated classroom interaction (Spender, 1982; Acker, 1994; Roland Martin, 1994); this 'poor' behaviour often being interpreted by teachers as a sign of boys' greater imagination and creativity to that of the quieter, more 'passive' girls (Clarricoates, 1975). The transmission of a 'gender code' (Arnot and Weiner, 1987; Acker, 1994; Arnot, 2002) within the learning experience was said to not only place female pupils at an educational disadvantage but reproduced the power relations of the male-female hierarchy, thereby reinforcing and producing conformity to stereotyped gender expectations.

Classrooms are established cultures in which teachers and pupils share expectations about the learning settings in terms of what is valued, taught and learned and how this is socially organized (Sheingold et al, 1984). Schooling processes and practices are therefore important in the construction of gender identity, for example, via the gendered ways in which teachers interact with pupils and each other (Francis, 2000; Francis and Skelton, 2001) and via the school curriculum (Paechter, 2000). As Haywood and Mac an Ghaill state 'school is a social process, a set of social relations charged with formal and informal meanings. All aspects of schooling are subject to these meanings and they are deployed across a diversity of areas' (2003: 63). Green has studied the role of music education in the reproduction of gendered musical practices and suggests that teachers and pupils 'collude with each other in the perpetuation of the gender politics of music: the construction of a gendered discourse on music that aids in the regulation of gender...' (1997: 186). Describing how gendered ideologies are enacted in the music classroom, Green argues that patriarchal notions of femininity and masculinity remain largely unchallenged making it difficult for boys and girls to subvert these normative constructions. I have drawn on the

above arguments in my analysis of the gendering of classroom cultures when discussing my findings.

1.2.2 Sexuality

One theme that I have not explicitly addressed within this study is that of sexuality, in terms of its practices and as part of gendered identity. However, I am aware that masculinities and femininities are often produced through a 'heterosexual norm', within education (Haywood, 1993; Epstein and Johnson, 1998; Francis, 2000; Francis and Skelton, 2001), music education (Green, 1997), music (McClary, 1991; Citron, 1993; Solie, 1993) and computing (Facer et al, 2003). Holloway and Valentine (2003: 68) argue that computer competence is also associated with marginalized forms of masculinity, whereby an overtly technological identity may be difficult for some boys who may be labelled as 'geeky' or 'nerdy' by other pupils, especially by other boys who may also equate this with being effeminate or 'poncy'.

Not only are 'acceptable' forms of heterosexuality heavily policed by pupils but by teachers as well. Epstein and Johnson (1998) noted in their work about secondary school and sexuality that there was a fine line between the heterosexually 'pure' girls and those perceived as 'overtly sexual'. Teachers went to great lengths to regulate (often unsuccessfully) students' self-presentations within this latter group; girls who continued to resist could get themselves labelled as 'tarts' for wearing too much make-up or 'slags' if they appeared to be overly sexually aware. This deployment of the Madonna/whore dichotomy therefore not only pervades public representations of women within society as a whole but within the specific context of schooling. The sexual exploits of heterosexual boys, on the other hand, is viewed very differently - often as a positive asset (Willis, 1977). This type of sexualized heterosexual masculinity is acceptable in ways that are not permissible when applied to heterosexual femininity, a femininity that is sexually pure, inactive and unavailable. Both

teachers and pupils regulate masculinity and femininity through the policing of sexuality. In his study of sexuality and male identity in a mixed sex sixth form, Haywood (1993, cited by Haywood and Mac an Ghaill, 1996) observed that the academic high achievers (seen as not interested in heterosexual relationships) were often labelled 'poofs' or 'gays'. The use of this homophobic abuse helped the 'Dominant Heterosexuals' and 'Hyper-Heterosexuals' to consolidate their 'experienced' heterosexual masculine identities by making alternative or contradictory masculinity problematic.

Although the themes outlined above occasionally impinge on some aspects of my discussion about composition and ICT, they are not central to my argument. Throughout my discussion, my research focuses on the production of gendered identities. However, where appropriate, I acknowledge issues of sexuality as they may arise and relate to my discussion but they are not my primary concern within this thesis.

1.3 The Research Focus

The aim of this thesis is to examine how assumptions about gender and technology become part of the culture of the music classroom. I explore how gendered discourses around music composition and technology are constructed and how young composers position themselves within these discursive frameworks. Through an empirical investigation into the compositional processes of cohorts of 15-18 year old boys and girls in four secondary schools, as mediated through digital music technology, the thesis interrogates the role gendered cultures play in the construction of the students' gendered identities.

The research focus explores how gender identity is constructed and performed in the technologized music classroom through adolescents' compositional processes. In order for me to pursue this exploration, it was important to look at the socio-cultural context in which the compositional process took place. This meant

considering the ways in which discourses of technological use and expertise are constructed by the prevailing cultural and structural factors within the music classroom, and investigating to what extent these cultural and structural factors impact on boys' and girls' compositional processes. I interrogate how these processes and practices contribute to the material and symbolic link between technology and masculinity in the production and reproduction of hierarchical gender categories within the music classroom.

1.3.1 Compositional Process

As can be seen from the research focus, this study is firmly on the compositional *process* rather than the actual product i.e. *how* the music is produced rather than *what* is produced. The process describes an on-going activity that changes over time, defined by Swanwick (1988) as products-over-time rather than the completed, fixed result. This thesis seeks to understand the ways in which boys and girls work with music technology during the various stages of the process (from the initial musical idea through the developmental, exploratory stage) and, by observing them composing and interviewing them about their compositional strategies, I am able to incorporate their own perspectives into this account. This reflexive aspect is central to the thesis, also evident in Folkestad's research into adolescents' compositional processes:

> Studying the process focuses our attention on the creator's perspective; his or her thoughts, acts and understanding of the activity become the basis of their description. In contrast, studying the product implies a shift in focus where the music is separated from its creator and is regarded as an independent object seen and analysed from the perspective of the observer... [F]ocusing upon the process instead of the completed product is to say that it is not the music itself that is the focus but the practice of musical creation. Within this perspective the

> music plays an important role as impetus and as a bearer of history and tradition, but without being the prime object.
>
> (Folkestad, 1998: 6)

This approach is also evident in a number of recent studies which have involved capturing compositional 'moments' during the creation of the piece but they do not include any systematic analysis of the completed work. Methods have been many and varied: building a series of MIDI files by using the 'save as' function on the computer (Folkestad, 1998); recording on-screen manipulations on to a videotape via a video-card installed on the computer (Seddon and O'Neill, 2003); to researchers developing their own music program, such as 'Music Mania', which could record a continuous stream of MIDI data enabling the researcher to unobtrusively observe children composing (Hickey, 1997). Ultimately, I am interested in the meanings adolescents attribute to the computer-mediated compositional process rather than developing an analytical framework for analyzing the compositions themselves.

Had I undertaken an analysis of the musical work it would have been necessary to develop an analytical framework that could take into account that the pieces written by the young composers in this study are often subject to teachers' interventions. Teachers often set the parameters of the work in terms of musical stimulus or style or they assist students in developing their work to a considerable degree as the following interview extract from an A level pupil in my study demonstrates:

> **CAROLYN:** Um, I started with a very good idea for the song but then I hit a hard wall sort of thing. I hit a barrier and it's quite hard for me to get over that and that was the point at which his [the teacher's] influence on the piece came in because he was getting quite frustrated that I wasn't getting on with this piece and *I* was finding it quite difficult getting on with the piece so he just went 'Well, do this, do that, think about the instruments coming in there' and giving me these ideas and I just went with

> them because I couldn't think of anything else to do. Um and I think that meant that it came out sort of with quite a lot of his ideas.
>
> *(A Level girl, Crossways Independent)*

To undertake a musical analysis of this work would have necessitated trying to unpick which aspects of the music the teacher influenced and finding a way of understanding the gendered nature of these musical interventions as they relate to the musical materials. Given the tools I have employed for this study, it was possible to ascertain to what extent this occurred during the compositional process and indeed such interventions by teachers figured differently in the relationships between teachers and girls, and teachers and boys. Again, it is the process and not the product, that I was mainly interested in. Ideally, I would have liked to consider both the processes and the products, and the dialectical relationship between them but this would have required a different set of research tools to the ones I have employed. It would have involved carrying out a sociological analysis of the data (as it is currently presented) together with a musicological analysis of a different data set (the compositional product). Consequently, such an undertaking would have been too big for a study such as this and it would have meant a less detailed analysis of the compositional process and the cultural context in which it occurs.

When we talk of a musical 'analysis' we must give sufficient attention to *what* is being analysed, for what reason and in what context (e.g. the musical genre or if the compositional is digitally mediated for example). There seems to be a tendency to opt for, what I consider to be, rather specious 'analytical frameworks' that often seem to reinforce taken-for-granted assumptions about the gendered aspects of the compositional work, rather than trying to develop a thoroughly musicological approach that might avoid analyses that may actually perpetuate gender stereo-types. Such analyses may be useful to uncover teachers' and pupils' gendered *perceptions* about composition, for example, but I would argue that it tells us nothing about the actual compositions vis-à-vis the musical

materials or the mode or context of production. Within mainstream musicology, types of analyses are many and varied and their use suits different purposes and different musics (such as Shenkerian analysis for understanding tonal music and set-theoretical analysis for understanding atonal compositions, for example). This should be taken into consideration in developing a rigorous, systematic analytical framework for understanding the possibly gendered aspects of a composition that also takes into account the cultural context of production (for example, both classroom and out-of-school settings) and the mode of production (acoustic or digital means).

Although, as I have stated, I have not carried out or developed such an analysis, I would suggest that one possible way of addressing this is to develop a semiotic analysis applying a multimodal perspective (Kress and Van Leeuwen, 2001) that could be one way of approaching the potential problems of analyzing children's compositions from a gendered perspective. Multimodality uses several semiotic modes (modes being resources used to develop an understanding of the phenomenon under inspection). Van Leeuwen (1999) has developed this approach to incorporate the modality of sound (such as timbre, genre, pitch, rhythm, melody and so on). He describes the elements of sound as *meaning potentials* used in the production and interpretation of music focusing on the material aspects of sound rather than its communicative function. This helps us to understand how the choices offered by semiotic resources have *semiotic value* and the potential they carry for meaning making. Certain 'choices' may become mandatory or conventional in certain contexts and the kinds of meaning they allow are also mandatory or conventional and, in this case there is no 'choice'. This seems very pertinent in light of the way certain types of software and the prescriptions of the music curriculum appear to influence the 'choices' young composers make in their music. As Van Leeuwen (ibid) asserts it is important to *contextualize* semiotic systems and put them into their historical and social setting therefore, applying this type of semiotic analysis might enable the development of a systematic analytical model that is able to take into account the musical

materials and the social context of its production. Applying this approach to developing a gendered semiotics would be an interesting area for future research but has not been possible to investigate in the ensuing discussion given the scope of this thesis.

1.4 Research Design and Methods

This study is located within a qualitative paradigm in that it is concerned with observing gendered interactions within the classroom and understanding the pupils' expressed views on their compositional experiences. The study was carried out in four schools – here referred to as 'Old Tech Grammar', 'New Tech Comprehensive', 'Crossways Independent' and 'Arts College'[8] - in London and the South over a five-month period in 2003. For both the pilot and the main study, I called upon friends and colleagues working in or associated with local secondary schools to generate a list of possible schools. Having gathered information about the school and the music department from OfSTED[9] reports and school websites, I compared this information (where possible) to a set of criteria established in order to select participating schools:

i) The school had to have access to and use computer-based music technology and associated software for composition teaching.
ii) The school must be co-educational and have a sixth form.
iii) The schools must represent a range of ICT provision and history rather than opting for schools with similar music ICT characteristics.

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[8] These pseudonyms aim to reflect the general characteristics of the school: *'Old Tech Grammar'* had a relatively long Music ICT history and had state-of-the-art compositional technology in a suite where all composition took place; *'New Tech Comp'* had only been using compositional computer technology for two terms; *'Crossways Independent'* was in the process of developing its music technology capacity and investment was planned for the music department; and *'Arts College'* had recently been awarded Specialist School Status in the Performing Arts, and was the only school that had an all-female music staff.

[9] The Office for Standards in Education – a non-ministerial department established under the Education (Schools) Act 1992 to take responsibility for the inspection of all schools in England.

iv) The teacher's gender within each department would also be a consideration as I wished to include one all male and one all female department.
v) The schools' demographics would be taken into account in ascertaining 'typicality' of schools generally in London and the South (as far as this is possible).

When approached, two schools from the short-list of six declined to take part. I then approached a local independent school that fulfilled the criteria who agreed to participate. For the main study, five schools had initially agreed to take part (including the two original schools used in the pilot study) but the fifth school requested that I delay my visit until Autumn 2003. However, the school failed to respond to my emails and telephone calls when contacted that September. Given the timeframe, I was unable to recruit another school at such short notice, leaving me with four suitable schools.

The pilot study was carried out at Arts College and New Tech Comprehensive in February-April of 2002. I had found the schools to be very helpful and supportive during this initial round of fieldwork and the analysis of the data had proved to be very rich, so I asked both schools to participate in the main study. The only difference between the design of the pilot and the main study was that, for the latter, I interviewed the teachers and doubled the number of pupils interviewed. The number of classroom observations and the mode of documenting them remained the same. For the main study, in each school I focused on one General Certificate of Secondary Education (GCSE) and one Advanced (A) Level class, the reason being that music composition within this age group is normally carried out individually (rather than in groups) in preparation for their exams.

1.4.1 Empirical Settings

The table below gives information regarding the type of school, the number of pupils in each class and the gender of the teachers that participated in the main study.

Fig 1: School Type Information

Name of School	Type of School	GCSE Pupils in the class	A Level Pupils in the class	Number & Gender of Teacher
Arts College	Comprehensive[10]	14 (5 boys; 9 girls)	7 (2 boys; 5 girls)	3 Female Teachers
New Tech Comprehensive	Comprehensive	21 (15 boys; 6 girls)	13 (3 boys; 10 girls)	3 Teachers: 1 Female, 2 Male
Crossways Independent	Independent[11]	6 (4 boys; 2 girls)	4 (2 boys; 2 girls)	2 Male Teachers
Old Tech Grammar	Grammar[12]	11 (7 boys; 4 girls)	8 (5 boys; 3 girls)	3 Teachers: 1 Female, 2 Male
TOTAL		52	32	

Below are brief vignettes of each school that 'set the scene' and provide contextual information including the history of music technology in that school and the percentage of pupils taking formal instrumental lessons. It should also be noted that, with the exception of Crossways Independent, the ethnic make-up of

[10] In the UK, nearly 86% of all pupils go to a State Comprehensive School, which admit pupils of all abilities and are not academically selective.
[11] Independent Schools charge parents fees and are academically selective, usually setting their own entrance exam for eleven year olds.
[12] The Government funds State Grammar Schools but pupils are selected for admittance on the grounds of academic ability.

the schools was predominantly white UK heritage and this is reflected in the music classes I observed. Furthermore, apart from Arts College all Heads of Department were male.

Arts College: School Roll 953, Sixth Form 196

This school is a non-selective Comprehensive located in an Outer London Borough, with parents characterized as 'below average' in terms of socio-economic status with 6% of pupils from ethnic minority backgrounds. In 2003, 56% of pupils achieved A*-C passes at GCSE. Recently it was awarded Specialist Schools Status in the Performing Arts. The music department consisted of three female teachers. The dedicated music technology room (installed in 2001) contained a hi-fi system and sixteen workstations consisting of a MIDI keyboard connected to a PC (a computer-pupil ratio of 1:1), arranged around the outside of the room facing the wall, with a square of tables and chairs in the centre of the room. In addition, there were three practice rooms and two music-teaching rooms. Of the whole school population, 13% of pupils were taking formal instrumental or singing lessons with more girls than boys taking formal exams. More than fifty per cent of boys played drums or guitar, in line with previous research into children's instrumental preferences (Abeles and Porter, 1978; Bruce and Kemp, 1993). There was little extra-curricular music available at the time of my observations.

New Tech Comprehensive: School Roll 1255, sixth form 280.

This school is a non-selective Comprehensive situated in the South West of England, with a large proportion of pupils coming from socially and economically advantaged homes. The pupils were predominantly of White UK heritage with a small number of pupils from other ethnic minority backgrounds, largely Asian. In 2003, 67% of pupils achieved A*-C passes at GCSE. The department consisted of two male and one female teacher (the latter having recently returned to classroom teaching after over a decade as a peripatetic woodwind teacher). There were two main teaching rooms. In the main room there were three music workstations with

MIDI keyboards and PCs plus a fourth in a separate practice room next door (a computer-pupil ratio of 1:3). The second teaching room contained twelve electronic keyboards with headphones. There were also five practice rooms, one of which contained a drum-kit. Some 9.2% of the school population received formal instrumental tuition. At A level, 84% of pupils had taken instrumental or singing exams. New Tech Comprehensive placed a strong emphasis on extra-curricular music with a range of activities including a choir, orchestra, jazz band, guitar ensemble and woodwind ensemble. Over a third of pupils also played in orchestras and bands outside of school.

Crossways Independent: School Roll 718, sixth form 134

This school is an academically selective Independent School situated in Inner London where 180 pupils currently receive fee remission through scholarships and bursaries. The school is situated in an area of high unemployment and ethnic diversity. The school reflects this as around 50% of pupils come from minority ethnic backgrounds. Recent figures for GCSE indicate that 85% of pupils achieved grades A*-C, 46% of which were at A* or A grade. The music department consisted of two male teachers, one of whom was a newly qualified teacher. Numbers taking music in the school were small and the ICT provision was a recent addition to the department consisting of three computers, two of which were connected to a keyboard (a computer-pupil ratio of 1:2). Music was very much a minority subject in this school, evidenced by the low numbers taking this subject, and could be 'dropped' by pupils in Year 9 in favour of Latin, which, within the culture of the school, appeared to have greater academic credibility. Some 17.6% of pupils had formal instrumental/singing lessons and there was a busy extra-curricular music programme, to which the large group of peripatetic teaching staff contributed. An after school 'Strings' concert I attended consisted of several rock bands, interspersed with violin, sitar and acoustic guitar performances.

Old Tech Grammar: School Role 946, sixth form 350

This selective grammar school is situated in the South East of England in an area characterised as well above average in terms of socio-economic status. Eighty per cent of pupils are of White UK heritage. Like Crossways Independent, the school consistently achieve higher than average GCSE results, most recently 98% of pupils achieved grades A*-C. The music department consisted of three teachers, two male and one female. ICT provision and general music resources were extremely high – the school had recently built a stand-alone music centre in which all teaching took place (opened in 2001). The main music room contained sixteen electronic keyboards and headphones, there was a small recording studio plus a 'state-of-the-art' dedicated music technology suite with twelve MIDI keyboards and PCs, together with mini-disk players and CD writing facilities. In addition, there was a third teaching room with a piano and hi-fi plus three practice rooms, one housing a drum-kit. Around 15% of pupils received instrumental and singing tuition in school with a further one hundred receiving tuition at the local Borough music school. The numerous extra-curricular music groups rehearsed either before school or at lunchtimes and included an orchestra, madrigal group, jazz band and choir.

1.4.2 Ethics

In carrying out the study, a number of ethical issues needed addressing. Firstly, I had to ensure the confidentiality and anonymity of the school, the teachers and the students. I asked the pupils' permission to record the interviews, assuring them that they would not be identified in any way during the writing up of the research or in subsequent papers that emerge from the thesis. In addition, I pointed out that they did not have to take part, but if they did, they also had the right to withdraw should they wish to do so at a later stage.

I also had to address exactly what I told the pupils and teachers regarding the focus of the research. Addressing similar concerns faced by Francis (2000), and

her study of gender and ethnicity in the secondary classroom, I was worried that if I provided too much detail about the gendered aspect of my work, this knowledge might affect the teachers' and pupils' behaviour in the classroom. Adopting the approach advocated by Francis (ibid) I therefore made the decision to give the teachers an indication of my intentions but to tell the pupils only that my interest was in boys' and girls' compositional processes using music technology without explicit reference to gender, although questions about gender were incorporated into the interview questions (see Appendix 2). As Francis observes, this raises issues about the 'informed consent' of respondents when agreeing to take part in the research. Ultimately, I had to balance this ethical concern against the aims of study. Ultimately, in order to prevent creating a potentially 'false' or self conscious situation where pupils and teachers were acutely aware that I was observing how gendered discourses operated within each classroom, I felt that it was acceptable to not make the full focus of the research known to the pupils. I believe my decision was appropriate under the circumstances as the integrity of the data may have been jeopardized had a full explication of the research been volunteered. In addition, there were no indications that the pupils or teachers experienced any harm owing to this decision.

Two of the teachers (at Crossways Independent and Arts College) asked to see what was written about their particular school before the thesis was finally submitted and I have let them see the relevant chapters. The other three teachers who were observed were also given the opportunity to read the thesis in whole or in part but chose not to do so. The female teacher at Arts College did not give any feedback other than to say that she found it interesting and would take on board some of the points I have made. The Crossways Independent teacher (who had taught both the GCSE and A level classes I observed), on the other hand, agreed with the majority of my findings but expressed some surprise at some of my conclusions with regard to one of his female A level pupils, Carolyn. However, he said he recognized that the gendered perspective I was adopting was highlighting issues that he had not given much thought to but he would certainly consider

some of these issues in the future.[13] With regard to the ethical concerns about withholding information from the pupils regarding the gendered nature of my work, neither of the teachers who read extracts from the thesis expressed any concern about this.

Finally, I was mindful that I was asking individuals to speak to me candidly not only about their compositional processes, but also about the meanings they attach to this creative activity and perhaps their feelings about lack of confidence or ability in relation to composition and technology. Therefore, I aimed to conduct the interviews sensitively to ensure that none of the respondents felt undermined or undervalued because of their comments.

1.5. Research Tools

For this study, I used a range of research tools including pupil questionnaires, individual semi-structured interviews for the pupils and teachers, and classroom observations in which field-notes were taken. Below I discuss the purpose of each research tool in some detail.

1.5.1 The Questionnaire

The questionnaires (Appendix 1) were completed by every member of the GCSE and A Level classes I observed and returned to me during my first visit, which

[13] My reasons for including the teachers' comments at this point of the thesis is to clarify that the teachers were given the opportunity to read the thesis if they wished, and voice any concerns they may have had about how they, the school or their pupils were represented. Although it would have been interesting to incorporate the teachers' comments into my final analysis, I have not done so for two reasons. Firstly, because only two of the six teachers read extracts from the thesis and so two of the schools would not have been 'represented' by the teacher's voice. Secondly, the comments made by the two teachers were very general and did not directly comment on *specific* aspects of my analysis. Although incorporating teachers' voices into the analysis process would have added a further level of reflexivity, this would have necessitated a different methodological approach to the one I adopted here.

generated eighty four questionnaires[14] thus enabling me to collate and organize the data in time for my second visit. Sections A and B provided information regarding age, gender and course of study and instrumental playing experience. Section C asked about musical activities both at school and outside of school and the final Section D contributed information about the type of music software students used at home and at school, and how much time they spent using it. In this section I also asked students to 'nominate' the person they felt was most able at using music technology in their class – the 'technological expert'.

This information was used to build up a picture of the school's musical culture; some schools had large numbers of extra-curricular music groups whereas others had very little and there were significant differences in the culture of instrumental playing and public examinations taken. Not only did it elicit important background information about the pupils' musical interests and musical activities but provided information regarding levels of use and type of music software used both at school and at home which was incorporated into my analyses. The data also helped me to select pupils for interview who appeared to be representative of the class or who seemed unusual for some reason (e.g. a pupil who had unanimously been 'nominated' as the 'technological expert'). This purposive sampling enabled me to pick cases based on their typicality or atypicality and the decision to obtain data from four schools enabled a wider degree of generalisability. As such, the questionnaire was employed both as a preliminary mapping for the next stage of data collection and to generate themes that would support and elucidate my arguments.

1.5.2 Classroom Observations

The aim of the classroom observations was two-fold: firstly, they were used to develop an understanding of how and in what ways discourse and social interactions produce gendered classroom cultures around music technology, and secondly to observe the students composing. I undertook three observations of

[14] Two (from New Tech Comprehensive) were discounted as the female respondents replicated each other's answers.

each class making a total of six in each school (twenty four observations in total) taking field-notes throughout unless I was in a situation where it seemed inappropriate to do so such as sitting in a practice room observing a student composing; such close proximity would have made note-taking rather intrusive. However, I wrote up my observations as soon as possible after the event, usually on the train journey home. I adopted Hammersley and Atkinson's guidelines (1983) regarding how these should be presented. Firstly, speech was rendered verbatim where appropriate because the actual words can be important analytically. These 'situated vocabularies' provide the researcher with valuable information about 'the way in which members of a particular culture organize their perceptions of the world and engage in the social construction of reality' (ibid: 153). As Brown and Dowling (1998) note, research is a constant process of recontextualisation whereby the researcher, in deciding what to record from observations, is imposing certain principles of selection and organization. Therefore, while my notes recorded the actualities of the situation as far as possible, the thoughts and interpretations that came out of these observations form part of the analysis. In addition, the field notes enabled me to check inferences made from one set of data sources against others (i.e. the interviews). What people say they do and what they actually do is not always identical. This is not to suggest that they deliberately set out to mislead the researcher. However, where there are possible discrepancies, multiple methods help to inform and illuminate the different types of data and help make sense of such anomalies.

It became apparent that my initial visits to the schools would inevitably situate me as a 'novelty' - a new face in the classroom. Even when the researcher is not supposedly part of the interaction, knowledge of her presence may have a significant effect (Hammersley and Atkinson, 1983), therefore while carrying out my observations, I was aware that my presence would always cause some sense of disruption to the setting. There will always be the problem of reactivity and consequently, where appropriate in the text, I adopt a reflexive approach that acknowledges my part in classroom interactions.

1.5.3 The Interviews

Having collated the questionnaire data I then arranged with the teacher which students I wished to interview. I carried out individual semi-structured interviews of about thirty minutes each with two boys and two girls (see Appendix 2) from each GCSE and A Level class (eight from each school; thirty two in total) and the class teacher (see Appendix 3) who was the same for both the GCSE and A Level class at Arts College and Crossways Independent. All the interviews were recorded and transcribed in full. I had four main themes I wished to investigate with the pupils: confidence, learning about music technology and what they liked/disliked about technology; technological expertise of the pupil and their perceptions of the teachers' and other pupils' expertise; composition stimulus and finally, the role of technology in the compositional process. By adopting a semi-structured format, respondents were free to elaborate on areas that they found of particular relevance or interest. The individual teachers' interviews aimed to illuminate the department's use and development of music technology, technology's role in the compositional process and their perceptions of gender in this context.

The use of interviews is probably the most common data collection method in qualitative research. However, whether structured or semi-structured, there are ongoing debates surrounding the status and validity of the interview. The traditional view is that questions and answers are analogues of stimuli, that what is being said is seen as a way of gleaning information, and that these verbal exchanges are viewed as behavioural events. However, Mishler (1986) suggests that the interview is not about verbal behaviour but is a form of discourse (an actual *speech* event) whereby the interviewer and respondent *create* discourse as they try to make sense of what they are saying to each other. He notes that respondents often define the question and take an 'active participation...in the construction of the meaning of the questions' (ibid: 54). This alternative approach views language as constitutive rather than representational and emphasizes that the interview is a social interaction between researcher and

researched. This appears to be more in tune with ethnographic research generally because it does not see data as being 'out there' ready to be collected and independent of our interpretations as researchers. Rather, data is discussed as something to be *generated* rather than collected and acknowledges the researcher's role in actively constructing knowledge about the world (Mason, 1996).

1.6 Data Analysis

Working within a qualitative paradigm places a high degree of responsibility on the researcher to make transparent how selections and interpretations are made in order that the reader can evaluate the research. Therefore 'what theory provides... is a way of making visible how, why and with what consequences we make particular decisions' so that the integrity of the process of analysing the data is open to scrutiny for others (Brown and Dowling, 1998: 45). As this thesis focuses on adolescents' experiences, constructed meanings and gender identity, I have analysed the data with the view that 'there are no objective observations, only observations socially situated in the worlds of the observer and the observed' (Denzin and Lincoln, 1998: 24). As my research questions were grounded in exploring how music classroom cultures produce gendered identities, I began coding the data by identifying particular aspects of the classroom culture. This included the use of language, traditions of technological use and the construction of the 'technological expert' for example. I was also interested in the structural organization of the classroom such as who circumscribes compositional practices, the gendered division of labour, and who occupies which technological spaces.

I began reading through each of the data sets that had been generated (the questionnaires, field notes, and interviews) and then went through each again identifying chunks of text that could be collated under general descriptive headings. I then began ascribing specific codes (see Appendix 4 for a full list of codes) to each of the data chunks across the different data sets so they could be

compared, and more appropriately grouped as categories were further developed. As I mentioned above, this allowed me to check inferences, compare anomalies, and to use these codes to both inform subsequent classroom observations and to explore these observations further during the interviews. Using a 'copy and paste' approach, I was able to pull together the data from each code into one single document which was laid out into three separate columns (questionnaire, field notes, interviews) so that I could develop an understanding of the relationship between these data sets. This was constantly refined and developed over the subsequent months as I continued to identify recurring themes, and as new categories emerged. This process of refinement is essential so that the researcher can begin to discern patterns, levels of frequency, inconsistencies and contradictions between groups and between individuals. This type of interpretive analysis, in which theory emerges from a particular situation 'grounded' in the data (Glaser and Strauss, 1967), means that 'theory becomes sets of meanings which yield insight and understanding into people's behaviour' (Cohen et al, 2000: 23). It is important to point out that, although the majority of the codes did emerge from the data in this very inductive way, some of the codes were informed by the literature. For example, my question about the 'technological expert' (whereby I asked the pupils to nominate the 'technological expert' in their class) arose from my engagement with the feminist sociology of technology studies literature, because the notion of expertise, and particularly expertise in relation to masculinity, underpinned many of the arguments put forward in this field. It therefore seemed important to investigate this within my study and so the question gave rise to an analytical coding that, to some extent, might be considered a 'pre-existing' category. This does not mean that I, in any way, superimposed a series of codings upon the data during the analysis. All were explored empirically and I endeavoured to maintain an open-mind in my analysis of the data whereby data that might, given my definition above, be considered 'pre-coded' could still be explored inductively to uncover new themes.

Within this paradigm I was able to explore what Cohen et al (ibid: 24) call 'the mechanisms by which participants achieve and sustain interaction in social encounters, the assumptions they make, the conventions they utilize, and the practices they adopt'. I do not claim to provide a set of understandings that offer objective replicability of results or generalizable accounts. It does not attempt to produce a *standardized* set of results but 'rather...a coherent and illuminating description of and perspective on a situation that is based on and is consistent with detailed study of the situation' (Schofield, 1993:93). Social scientists working within this paradigm acknowledge that what they find cannot be substantiated as 'truth'. But, by making the process and categories of analysis clear and transparent, the reader is able to trace the research process behind the findings. Although ethnographies are not 'fictions' they are, in part, 'constructed truths' in the sense that they are inherently partial because ultimately they reflect what the author chooses to put in or leave out (Clifford and Marcus, 1986). Since the 1980s there has been a general trend towards 'specifications of discourses' in ethnography i.e. who speaks, who writes, when, where and for whom. We have become more aware that reading and writing ethnography is not just about the *interpretation* of cultural texts but also about their relations to production which means acknowledging one's role as a researcher. The researcher's voice cannot remain hidden; the researcher is a co-participant both in the research process and the ways they interpret other people's stories and researchers must make this explicit in the way they present their findings. Scott and Usher are critical of texts that obscure the authorial voice:

> In other words, texts are created that are author(ative) but seemingly without author(ity). Such texts obscure the ways in which researchers *construct* their analyses and narratives – they are written as if researchers were simply vehicles for transmission with no voice of their own. Yet this stance has nothing to do with the world or the nature of objective reality...but everything to do with *textuality*, with the

> rhetorical devices and conventions that organize meanings in the research text in particular ways and for particular effects.
>
> (Scott and Usher, 1999: 16)

Within qualitative research there is always this need for recontextualisation. As Brown and Dowling (1998) note, the participants' own accounts of what they are doing are not explanations; this responsibility lies with the researcher. Therefore, the researcher is responsible for making explicit certain principles of selection and organization and addressing how their presence can affect the dynamic of the classroom and behaviours therein.

1.7 Issues when Researching Children

Feminist researchers have been especially concerned with the issue of power in how the lives of marginalized groups are represented – one of those marginalized groups being children. Ultimately, it is the researcher who has the power to determine and define the 'meaning' of responses and findings (Mishler, 1986) and therefore feminist researchers attempt to 'offer a way of constructing children as active subjects, not objects, and of recognizing that they may have distinct perspectives on the world' (Alldred, 1998: 150).

One aim of feminist approaches has been that of 'empowerment', a term used to describe 'an enabling power to do something rather than a power over someone' (Humm, 1995: 78). In ethnographic research the aim has been to 'give voice' (a form of empowerment) to under-represented social groups whose experiences often remain unheard. This 'giving voice' is also achieved by producing accounts that we feel (as researchers) both accurately represent participants and remain faithful to their articulated experiences; by giving them the opportunity to reflect on these experiences, we presume to offer the research experience itself as something inherently positive and beneficial for those involved. However, it is difficult to judge to what extent this is achieved, if at all. Throughout my data

gathering, I was careful to create an atmosphere of safety, openness and respect and felt that I had a good rapport with the students. However, it is difficult to ascertain to what extent my respondents felt the research might have benefited them. Often young people may feel compelled to make themselves understood in adult-centred terms (although this is not to imply that adult respondents do not also monitor and filter their responses accordingly) and because of this requirement to make sense for adults, the interview may not necessarily be an empowering occasion for children (Alldred, 1998).

Taking this into account, the respondent's social and personal contexts of meaning are deeply significant because, as Alldred (1998) points out, if we view ethnographic subjects as free to present their own meanings we neglect the ways in which the dominant culture hegemonically provides meanings. This type of work *appears* to allow many 'voices' to be heard in the interests of generating counter-hegemonic analyses but we must not forget that these voices are themselves embedded in the scripts of the dominant groups which may circumscribe and prescribe how these 'voices' are represented (Fines, 1994 cited in Scott and Usher, 1999). Ethnographic accounts are not mere representations of the world but part of the world they describe and are shaped by the contexts in which they occur (Hammersley and Atkinson, 1983). I have brought this sensibility to bear on the interviews carried out for this study.

Not only do we need to consider how adult researchers represent the voices of young people but it also brings to the fore issues about the relationship between adult interviewers and adolescent interviewees. Despite introducing myself by my first name to the pupils, teachers generally referred to me as 'Miss' in front of the pupils which meant that the pupils also referred to me in the same way. This accorded me the (unwanted) status not only as an adult 'guest' within the school but also as another teacher by proxy. This formal mode of address possibly exacerbates the power relations that may be said to exist between adults and

young people; this makes it difficult to set up less power-laden interactions because of pupils' perceptions of the researcher.

Often researchers talk of 'entering the child's world' and interacting 'with children in their perspective' (Mandell, 1991, cited by Alldred, 1998) but this may actually construct them as 'Other' to the norm of adult culture. Alldred (1998: 151) states that this approach '...constructs children as little aliens to the dominant culture, the exotic objects of some other culture'; rather than being the *subjects* of our research, they become its *objects*. Children (and adolescents), as a social group, are perhaps the most disempowered within society, having virtually no independent rights – what they do, say and how they behave are circumscribed by the expectation of adults (parents, teachers and so on). Lemke (1995: 138) states 'fabulous fictions' that construct childhood have been invented about 'the effects of normal hormonal processes of maturation on their judgement' and mirror 'fictions' told about women in an earlier era in relation to their ability to manage their own money, property or sexuality, for example. Childhood is also a constructed category that applies values and expectations (ascribed by adults) about what 'childhood' means based on 'facts' about those to whom we apply the term 'child' (usually individuals under the age of sixteen). As such, the child's 'culture' within the school is likely to be viewed by researchers as something to find or observe rather than acknowledging that this 'culture' consists of a variety of complex processes in which the children (and adults) are actively engaged.

Therefore, throughout the thesis I have tried not to view the student's culture as something 'other'. On the contrary, like other researchers (Green, 1997), I have taken the view that classroom culture is a dual process of construction by the students and the teachers. Although I cannot make claims for anyone's 'empowerment' follow-up comments from the respondents' teachers included remarks such as 'It was really good to be able to talk about my work properly' or 'I really felt I was being listened to' were heartening. Their willingness to engage in conversation with me inside and outside the classroom and the depth and

thoughtfulness of their responses when discussing their composing during the interviews suggest that their participation in the study was largely a positive experience. Ultimately, my aim throughout this thesis was to have retained the sense of the students and teachers as *significant, active subjects* with honesty and integrity and I hope I have achieved this.

1.8 Organisation of the thesis and content of Chapters

The final section of this chapter shows how the thesis has been structured and organized. Chapter 2 is concerned with technological theories as they relate to the fields of gender and music technology while chapters 3 to 6 report the empirical findings. Chapter 7 summarises my findings, illustrating how they contribute to the field of music education. A discussion of the relevant literature is integrated into the body of this thesis in order to develop and sustain my arguments. This provides a more coherent and cogent argument which enables me to better highlight the parallels between the masculine discourses of technology found within the sociology of technology texts and those from music education and feminist musicology.

In Chapter 2, I critically engage with theories of technology that have proved influential in current thinking about the relationship between technology and society, illustrating the importance of engaging with technological theory in order to better understand how and why these powerful technocratic discourses often go unrecognized in discussions about technology and music education. By examining the orthodoxy of technological determinism, which views technology as having an 'inevitable impact' on the shaping of society, I highlight how many of the tenets of determinism can be discerned in the music technology education literature. I then go on to examine technological theory that has argued for the inclusion of the social dimension of technology. I discuss how this emphasis on social context relates to recent feminist concerns that have brought to the fore the gendered aspects of music technology.

Beginning my analysis of the empirical data, Chapter 3 explores the processes and practices that contribute to the gendered culture of the music technology classroom. It provides the context for understanding how institutional factors shape and are shaped by gender-technology relations. It aims to explore the nature of 'technological talk' and considers its impact in constructing gendered perceptions about boys' and girls' ways of learning about technology and technological confidence. I then offer a discussion of the processes that contribute to normative masculine expectations regarding how males control technology and technological information.

Chapter 4 examines in detail how the concept of technological expertise is constructed. I explore how the technological 'expert' is constructed and examine who is able to define what is and what counts as technological knowledge. I illustrate my arguments about the digital music classroom by highlighting the similarities found between the gendered social relations within the home and the workplace in order to show why males and females are positioned differently in relation to different technologies. This offers a much richer and more complex understanding of the gendering of technology and provides the context in which to place my subsequent analysis. I argue that the dominant discourse of technological expertise and competence constructs a hegemonic technological masculinity which girls (and some boys) are unable and unwilling to adopt. I end this chapter with a discussion of how the gendering of music software is implicated in this process as it becomes positioned as a 'masculine' or 'feminine' technology.

Chapter 5 looks at how historically and culturally women's compositional spaces have been confined to the private, domestic sphere. Drawing on recent feminist theory into new technological 'cyberspaces' and physical spaces, I explore to what extent these might open up new possibilities for female composers in the classroom.

Chapter 6 begins with a discussion of the compositional stimulus and its effect on the students' ability to develop musical ideas and their sense of ownership of their music, drawing on the ideology behind perceptions about girls' 'conformity' and boys' 'non-conformity'. The remainder of the chapter is the culmination of my discussion. The in-depth examination of the classroom culture offered in Chapters 3-5 provides the context in which to situate the compositional processes of boys and girls as it is mediated via music technology. To illustrate my argument I continue to draw on recent cyberfeminist[15] theorizing with particular reference to the influence of Haraway's (1990/1985) 'cyborg' metaphor in understanding the relationship between women and technology and what it might mean to be a 'musical cyborg'.

Chapter 7 returns to the research questions, summarises the main research findings and outlines my main contribution to the field of music education. I point out some of the limitations of the empirical investigation and make suggestions for future research in this area.

[15] The term 'cyberfeminism' refers to feminist theorizing that is concerned with the ways in which new technologies are reshaping culture forms and practices as they relate to women, electronic communication networks and virtual reality.

CHAPTER 2: SOCIAL THEORIES OF TECHNOLOGY AND THEIR RELATIONSHIP TO GENDER AND MUSIC TECHNOLOGY

2.1 Introduction

The impetus behind this thesis is an over-riding concern with the social contexts of technologies, which I suggested are largely missing from current discussion about music education and technology. In this chapter, I argue that these discussions perhaps unwittingly mirror many of the tenets of technological determinism, a powerful and largely orthodox view of technology's so-called 'impacts' on social change and social structures that reinforce the 'centrality and normativity of technology' (Wyatt et al, 2000: 25). By unraveling the tenets of technological determinism, I illustrate how determinist thinking implicitly produces an uncritical technocratic discourse about music technology that ignores important and often troubling issues relating to gender.

I then contrast this with theoretical positions which suggest that, rather than viewing technology and society as separate spheres influencing each other, technology and society are mutually constitutive (MacKenzie and Wajcman, 1999). This shift of focus highlights the social dimensions of technology, which seek to understand how different social groups shape the development and meanings associated with a particular technology. This articulates with recent feminist theorizing that has placed gender at the forefront of discussions about technology. These arguments are pivotal to the theoretical position I have adopted and helps illustrate the parallel concerns feminists have highlighted regarding gender and music technology. I will begin with a brief definition of the way in which the term 'technology' is used in the sociology of technology and how I employ the term in this study.

2.2 Definitions of Technology

It is not always possible to provide a conclusive definition of a particular term, especially a term like 'technology', which conjures up a myriad of images. As Street (1992) suggests, defining a term depends on teasing out shared understandings of the way in which the term is used. The word 'technology' is derived from the Greek *tekhne*, meaning art, craft or skill, while *logos* means knowledge i.e. the knowledge *of* artefacts but in modern usage it has come to be associated with the artefact alone. Therefore, although it may appear too clear-cut to separate them out in this way, there are common threads running through the literature as to how the term 'technology' is currently used and they can be loosely identified as:

i) Technology as a 'tool' or piece of hardware fashioned for a particular purpose i.e. its material components.
ii) Technology as a system requiring appropriate knowledge and skill.
iii) Technology as a social process affecting and reflecting types of social relations.

Having teased out these three formulations, it becomes apparent that all technologies are actually a combination of the above and our understanding of what technologies do and what they mean is informed by this more complex definition; a purview of technology as a 'system' or 'network' (Wajcman, 2004). Furthermore, a common thread connecting them is that they all involve *human agency*: the piece of technological machinery does not work on its own, it has been programmed and designed to carry out a particular task but that task has a human hand behind it; the social system is embedded in social relations created and enacted by people. As such, it is possible to talk about technology in several separate ways but, within this thesis, it is perhaps more helpful to conceptualise them as interrelated: the use of the artefact requires and produces knowledge that

is embedded in a system of social relations therefore drawing a more intricate picture of technology that recognizes its social context. Ultimately, I hold on to the notion that 'technology is a socio-technical product, patterned by the conditions of its creation and use' (Wajcman, 2004: 34).

2.3 Technological Determinism

The term 'technological determinism' offers accounts of technology that posit technology as an independent process, whereby technological change *determines* social change. In this formulation, not only is technology said to work independently but it tends to develop slowly suggesting a process of natural evolution contained within the logic of that technology; there is predictability about its development and its 'effects'. For example, it has been suggested that the social make-up of the labour force correlates with the 'needs' of the technological base and the hierarchical organization of work whereby different technologies require different labour forces and degrees of supervision. This type of argument views technology as containing an inner logic that produces inevitable 'effects' on society and technological developments are taken to be the most important single factor in explaining particular shifts in society (Heilbroner, 1972, cited in Street, 1992). These technologies are assumed to have a 'natural' trajectory and their development and use cannot be challenged or struggled over. Technological advances will happen automatically thereby producing what May (2003) critically calls 'the myth of inevitability'.

The orthodoxy of technological determinism, however flawed it might be, remains immensely powerful in contemporary society and the phenomenal development and wide-spread availability of information, communication and digital technologies continues to fuel this 'myth'. A technologically determined orthodoxy can be detected in the early theorizing about the mass media as a natural sensory extension to ourselves encapsulated in McLuhan's famous phrase

'the medium is the message' in which the 'message' of the medium or technology supposedly accelerates and changes human lives. Here the medium 'shapes and controls the scale and form of human association and actions' (1964: 9) and so the *form* in which the message is transmitted to us is more important than *what* is communicated. More recently, it underpins Negroponte's (1998, cited by Freedman, 2003) prediction that 'landlords would be far less important than webmasters. We'll be drawing our lines in cyberspace, not in the sand' in relation to what he views as the ultimately 'transformative' powers of the Internet in our new information society: there is no alternative to *being digital* (Negroponte, 1995). May sums up this lauding of digital technology as a belief that the 'information age becomes the explicit expression of inevitability, of progress, of the technological future made present' (2003: 4).

These types of determinist accounts assume that technology has the ability to 'impose its own discipline and its own patterns over and above the efforts of specific agents to use technology for particular purposes' (Freedman, 2003: 175). There is no room for social context within these determinist accounts so to adopt such a position is to deny the possibility of self-determination; our existence is understood as little more than a series of events over which we apparently have no control. Unsurprisingly, this has been met by much concern. Whereas early commentators such as Bell (1973) thought that technology might be shaped to improve social conditions, May fears that this has not been the case and that the current information society:

> ...has become a wave which we can surf but cannot change or modify. This shift from engagement to passive accommodation has been accomplished by presenting these developments as epochal rather than taking place *within* contemporary society.
>
> (May, 2003: 3)

Therefore, a refusal to acknowledge the social aspects of technology has serious

consequences for society. Attributing a 'rationality' to technology that has nothing to do with human agents removes all responsibility from those who wield power or those who seek to wrest it from those that already have power (Street, 1992).

In the following section I suggest the discourses currently in operation about music technology and education echo these determinist orthodoxies constructing what Freedman (2003: 185) calls a 'common sense' view of digital systems as innately democratizing.

2.3.1 Determinist Discourses of Music Technology and Composition

The powerful ideology produced within current UK Government policy on music, education and ICT draws on the present 'information age' discourse, which compels pupils, teachers and parents to acquire and adapt to the new technologies of the 'ICT revolution'; to be 'unwired' is to be potentially disenfranchised from society (Selwyn, 2002). Arguing for the benefits of computers and their positive impact on the American educational system, the work of Bennett (1999) perhaps exemplifies the extremes of this determinist discourse:

> Computers have taken a major position in the world because they can execute many tasks more effectively than humans. In education, they can communicate information more efficiently...For computers to accomplish in education what they have done elsewhere... they must be allowed to teach students without a human in the intermediary position between the child and the computer.
>
> (Bennett, 1999)[16]

Bennett unquestioningly places his faith in the one-way 'cause and effect' nature

[16] Taken from an article on the web and no page numbers were given.

of technological progress; he is unequivocal about the need for education to change to fit the demands of these technologies in order to produce positive effects on education: 'the answer to present educational woes is simple – use computers...' (1999). Selwyn (2002) argues that the development of the National Grid for Learning (NGfL), launched by the UK government in 1997, adopts a similar discursive position. The aim of the NGfL was to integrate ICT into UK schools by aiming to provide full internet access for teachers and pupils and make available on-line resources that would also provide access to educational software and curriculum materials. Selwyn points out that, despite some of the 'physical' shortcomings of some of the Grid's aims (such as dropping one of its initial targets to provide all pupils with email addresses) the discursive construction of the NGfL remains integral to the powerful rhetoric surrounding educational technology policy. It continues to shape expectations about education 'within a restrictive technocratic and determinist discourse, thus conforming to traditional narratives of society and technology' (ibid:39). This seems particularly pertinent when school OfSTED reports sometimes read as little more than a constant 'rap over the knuckles' when schools fail to integrate ICT sufficiently into all aspects of the school curriculum – as if the complete technologization of the curriculum offers a panacea for education.

Drawing on data collated from recent OfSTED inspections of Key Stage 3 music lessons into what characterizes good teaching with ICT, Mills and Murray (2000) do make the salient point that, while ICT during Key Stage 3[17] is a curriculum requirement, there are aspects of the National Curriculum that can be effectively taught without ICT. Although music ICT can support learning and increase pupil motivation in some cases, in 'good' music teaching 'ICT was not allowed to take over the role of the teacher' (ibid: 134). Despite pointing this out, some of their subsequent comments unintentionally replicate the rhetoric of determinism asserting that ICT offers all young composers wider creative possibilities: no

[17] Key Stages are the main areas into which the National Curriculum for schools are divided: Key Stage 1 (5-7 year olds); Key Stage 2 (7-11 year olds); Key Stage 3 (11-14 year olds) and Key Stage 4 (14-16 year olds).

longer were pupils limited to compositions they could play themselves, remember or notate; they could 'produce compositions that verged on unplayable on acoustic resources' (ibid: 141). Although this may open up interesting sonic possibilities, the uncritical assumption that this is a positive aspect of ICT-mediated composition for all young composers is not echoed by the experiences of some of the pupils in my study, as this female student's comment illustrates:

> **CAROLYN:** I also found that it ended up with me composing things that possibly I couldn't play because you could hear they sounded good on the computer but...that threw me a bit.
> *(A Level girl, Crossways Independent)*

Alternatively, Stephen's and Craig's attitude to this aspect of their computer-mediated compositions appears less problematic to them as the conception of their music *is* fully integrated in the way Mills and Murray describe:

> **STEPHEN:** Well, if it's on the computer I don't *intend* it to come out. That would just be a computer thing.
> *(GCSE boy, Old Tech Grammar)*
> ***

> **CRAIG:** Um, it's easier to, because it's on a MIDI keyboard as well.
> **VA:** Do you then play it live from the score?
> **CRAIG:** No, no. Um, we've never really played live anything, it's just something we do for fun at home, yeah. It's all MIDI.
> *(A Level boy, Old Tech Grammar)*

These comments taken from the pupils' interviews begin to reveal how determinist thinking obscures differences between young composers; differences articulated through a gendered lens that remain unacknowledged and therefore are rendered invisible.

The comments made by Mills and Murray (2000) echo what seem to be increasingly 'common currency' in the music education literature that posits music technology as having an inevitable and usually beneficial impact on how pupils compose. The literature uncritically lauds its 'transformative' aspects and

its 'democratizing' and 'empowering' potential (Folkestad et al, 1998; Hodges, 1996; 2001; Phillips and Pearson, 1997; Rogers, 1997) asserting that pupils achieve greater compositional 'success' when using music technology (Savage and Challis, 2001; 2003). Reporting on a large-scale curriculum-based music project in which pupils from Years 7 to 10 were asked to compose an electro-acoustic piece using a range of technologies, Savage and Challis (2001) were interested in implementing 'innovative' uses of ICT that would enhance teaching and learning in music. Their stated aim for the project was 'to attempt to demonstrate the empowering and facilitating nature these new technologies can have for *all* pupils when used imaginatively and constructively in the classroom' (ibid:140). Many pupils within the project clearly did find some of the technologies useful, especially those that provided a wider range of sounds than was normally available and those that enabled new ways of manipulating sounds such as the software ProTools – a digital audio mixing programme that works in a similar way to that of a traditional multi-track tape recorder. However, although a wide range of software and hardware was made available to the pupils, it became apparent that some were too difficult to use and master given the project timeframe. This led Savage and Challis to conclude that the impetus behind the use of these technologies was related to their accessibility and ease of use irrespective of the creative possibilities they may have offered. Savage and Challis ultimately deemed the project a 'success' because they claimed the different technologies used 'empowered the majority of pupils' (ibid: 147); however, no mention is made of the implied 'minority' who were presumably not 'empowered'. Their notion of 'empowerment' is somewhat obscure and rather narrowly defined. They claim that the technologies had a positive impact because pupil empowerment was judged by the degree to which pupils 'did not rely on a traditional grounding in instrumental skills' (ibid: 146) and the extent to which pupils were able to develop more sophisticated musical thinking given this set of technological tools. Their argument produces a musical discourse that not only ignores differences in pupils' approaches and aptitude to this type of compositional setting, but also appears to place higher value on digitally mediated

processes because of what it enables pupils to do in contrast to more 'traditional' methods.

In their discussion of compositional strategies, Folkestad (1998) and Folkestad et al (1998) make a similar claim that all pupils within their studies 'succeeded' in creating a piece of music, leading them to assert that composition is no longer the preserve of the gifted few (which, if this is the case is, of course, welcomed). . They do not critically examine these 'impacts' or explore, from the student's perspective, if they really are as beneficial or as democratizing as they assert. However, they do offer a small caveat to these blanket claims that different types of software might affect ways of creating music. For example, the type of interface or inputting device (usually a keyboard) might be more helpful to some pupils than others might and may restrict musical ideas, steering the music into a different direction. Airy and Parr (2001) make a similar observation but are critical of the unquestioned benefits of music technology, arguing that the supposed advantages of MIDI technology reported in the literature are based on generalized and unsubstantiated claims about its efficacy and democratizing potential. Their own work places students' experiences at the centre of their investigation into MIDI use. Although they do not address gender issues, they recognize difference and diversity in the use of MIDI. For example, within the MIDI sequencing environment four different interfaces, via different editors, are provided – each window displays the same data but in different formats – and their study shows that different editors support the individual musical aptitude of the student. Students with formal musical training found that the notation editor was most useful while those with little music reading ability found the matrix editor useful. Although it displays the pitch and length of musical notes, pupils can lengthen or shorten notes without worrying about writing down the actual note values, such as a quaver or minim. They also observe that the most commonly used MIDI controllers (through which musical ideas are played into the computer) was the keyboard, but those lacking keyboard skills found it a major barrier to composition. Drummers, who use hands and feet, experience

significant difficulties in having to externalize their ideas through this medium.

Hickey's (1997) work is a salient example of the problems of adopting a narrow view of technology's benefits without reference to the social aspects of research subjects. Her study compares the compositional processes of two boys when writing computer-mediated compositions; neither was normally considered 'good' at composing by their class teacher nor particularly motivated. 'Jon' was described as a boy who required continuous attention and achieved this by deliberately providing wrong answers in class and singing out of tune. 'Billy' was considered much quieter but prone to wander off task during music lessons. Using a researcher-designed computer program called *Music Mania,* the boys were guided through various musical composition activities that provided systematic steps towards the final outcome. These comprised three sections: Introduction, Exploration and Composition, which encouraged the pupils to experiment with different timbres and eventually record some of the musical ideas. These sections were recorded and stored in MIDI data format although some of the musical data were recorded unknowingly as the pupils worked on their compositions and so pupils were not always aware when their work was being monitored. Hickey draws on theories of intrinsic motivation and its role in creative thinking, which argue that intrinsic motivation is an essential element for quality creative production – when we are personally motivated by interest or enjoyment we are likely to be more creative. Alternatively, when we are under surveillance and reliant on external rewards or evaluation, motivation and creativity decreases. Within this framework, Hickey asserts that the boys produced their most exploratory and creative musical work during the periods when they were not aware they were being recorded because they were in a non-evaluative environment. She ascribes these benefits to the computer-assisted environment which she hails as 'the most intrinsically motivating environment for children to produce original work' (ibid: 56) because pupils can work independently at their own pace without being monitored. She asserts that 'Billy' was able to 'show-off his creative musical potential' in a way that would not have

been possible in a typical musical classroom because he was able to work alone in a 'safe environment' (ibid: 67).

Hodges (1996) made a similar observation when he stated that new technologies can 'liberate' composers. Because they can give immediate aural feedback, the composer is no longer dependent on their own music skills; the emphasis within computer-mediated composition is now on pupils controlling their own learning environment. However, the 'benefits' of this autonomy come at a cost. Although Swanwick (1994) also asserts that the autonomy of the student is paramount and the 'private world' of the composer is a good thing, he is concerned that ICT tends to reduce face-to-face interactions which runs counter to his belief that music is ultimately a social art. As Kwami (2001) also notes, this emphasis on individuals working alone at their computers means that there is often very little interaction or sharing with other pupils or even the teachers. Crook (1994: 98, cited in Busen-Smith, 1999) appeals to educators to move away from strategies 'based exclusively upon interacting with computers, towards solutions which consider computers as a context for social interaction'; a position that stands in sharp contrast to that advocated by Bennett (1999), as outlined earlier.

Based on the experiences of her two male research subjects (discussed above), Hickey insists that the 'computer is a tool to which children are highly attracted and are able to use with ease (often above and beyond our own capabilities!)' (1997: 69), and this seems to be a recurring theme in discourses about music technology and education. The assumed inevitability about children's and adolescents' relationship to and use of computers is generally framed within a pedagogic rather than a social discourse. Hickey makes no mention of the pupils' gender even though, as I pointed out in the previous chapter, the social aspects of boys' greater liking for computers and higher levels of computer use are well documented. Hickey's approach emphasizes what Holloway and Valentine (2003) suggest are technological determinist interpretations of children's use and relations to ICT; their positioning as 'natural' users obscures difference and

inequality. This type of attitude to technology ignores the mechanisms that produce gendered social relations and the factors through which these gendered differences are produced and maintained. I believe that current educational discourse about technology and its use in relation to music composition further contributes to this situation by neglecting to address the social aspect of computers and their use.

Ultimately, I would concur with Winner's (1977) assertion that the concept of determinism is far too sweeping in its implications to provide an adequate theory for understanding technology's relationship to society. It does little justice to the genuine choices that arise, in both principle and practice, in the course of technical and social transformation. Paying attention to the social dimensions of technology results in a shift away from the notion of technology as an autonomous driving force that will impact and shape society to an incorporation and acknowledgement of the social factors that impact on technology. It is to this dialectical relationship between the technological and social that I will now turn.

2.4 The Social Dimension of Technology

Acknowledging the social dimensions of technology incorporates the human choices that produce the dynamics and direction of technologies (Mumford, 1934; Williams, 1974; May, 2003). Technology's 'social embeddedness' is what counts – the interaction between human beings and technology means that there is no 'natural' one-dimensional trajectory, no foreclosed future that we cannot change: 'There is no such thing as *the* future; there are many, many futures. And our concern should be with what the future ought to be, what we want it to be' (Sardar, 1997:27, cited by May 2003:6). Critics of technological determinism do not deny the importance of technological innovation in society but, as Winner (1977) argues, the fundamental problem arises when one tries to isolate individual 'causes' attributed to social change. He argues that it is impossible to prove that

any one factor, in this case technology, could be *the* primary determinant. He makes the interesting point that there have been periods in history where advances in scientific and technical knowledge did not have a profound effect on social practice because the social conditions were not appropriate. He cites the Alexandrian inventions of the second and third centuries B.C. in which primitive versions of both the steam engine and the wheeled cart appeared but neither was taken up because, at the time, these technologies had little use within the social and economic context of Alexandrian society. Winner points out that 'patterns of technology are themselves influenced by the conditions in which they exist' (ibid: 76). He is therefore not arguing for a rejection of the importance of technological innovation but advocating a more dialectical approach to understanding technology: that it is both a determinant of and is determined by the society in which it exists. Technologies therefore *reflect* and *affect* the surrounding social conditions (Bromley and Apple, 1998).

2.4.1 Identifying Social Groups

An important aspect of this socially embedded view of technology has been its ability to show how different meanings and interactions come to be associated with distinct social groups. The work of Bijker et al (1990) is one of the first attempts to define the 'relevant social groups' significant in the development of a technological artefact and the meanings that different social groups associated with it. They suggest these meanings are formed by the interpretive flexibility of the artefact. In their research into the development of the 'Rudge Ordinary' bicycle, Pinch and Bijker (1990) examined the different meanings particular social groups associated with it. This bicycle had an enormous 56-inch wheel and air-tire that pushed the rider very far forward over the front wheel; at such a sharp angle, one could easily be propelled over the handlebars. This precarious, unsafe aspect of its design delighted many young men who interpreted this bicycle as a daring, exciting 'macho machine' ideal for sporting purposes. In contrast, Pinch and Bijker suggest that women and elderly riders took an alternative view: rather

than seeing it as an exciting, fast new design it was a dangerous and unsafe contraption unsuitable for general transport, its size and design making it difficult for women to ride given their generally smaller size and mode of dress.

It is important to recognize that social groups do not exist within a vacuum and the decisions they make about technology reflect their own values and expectations. As Wajcman (1991: 23) states, 'technological change as a process is subject to struggles for control by different groups...[whose] outcomes depend primarily on the distribution of power and resources within society'; the developmental process brings out conflicts between differing views of the technical requirements of the device. Consequently, Pinch and Bijker's formulation of 'social groups', while a step in the right direction, is somewhat limited. They identified their social groups empirically, largely through historical documents, noting all the social groups mentioned in relation to the artefact, but this is not wholly satisfactory because some social groups are excluded; having had no discernible influence on the artefact, no mention is made of them in such documents.

This is particularly relevant in understanding why gendered concerns are often side-lined in discourses about music and technology and the importance of feminist theorizing in helping to rectify this position. Before embarking on this discussion, I offer a brief discussion about the concept of gender and identity as it relates to this study.

2.4.1.1 Understanding Gender as a Social Category

Gender is an element of the social structure created by and within individuals 'as they learn the discursive practices through which that social structure is created and maintained' (Davies, 1989: 12). As Davies (ibid) has shown, gender is felt to be integral to a successful social identity and young children go to great lengths to maintain gender boundaries, which are produced through discursive constructions

of femininity and masculinity, which position and define the gendered subject through normative discursive practices. As Francis (2000) notes, although individuals employ different strategies for 'doing' gender we can assert there is one 'notional' masculinity and one 'notional' femininity constructed as oppositional:

> I interpret the various 'kinds' of masculinity and femininity...as the various ways in which men/boys attempt to achieve masculinity and femininity. In other words there are different *strategies* for constructing oneself as masculine or feminine, rather than different types of masculinity or femininity.
>
> (Francis, ibid: 16, my italics)

This focus on *strategies* reflects my own conceptualization of subjectivity and identity within this thesis. I am interested in how knowledges and practices seek to define and map the production of the gendered subject. As Walkderdine (1998: 165) points out, 'practices create subjectivities...those practices read materiality in a particular way: they tell stories which are profoundly oppressive'. Consequently, I am interested in the *ways* in which boys and girls construct themselves as masculine and feminine within the music classroom within the discursive frameworks available to them.

However, we must be mindful that these subject positions may not be voluntary because of the political and social structures through which dominant femininities and masculinities are set (Laurie, 1999 cited by Reay, 2001); gender 'is always relative to the constructed relations in which it is determined' (Butler, 1999: 15). As Francis observes:

> ...gender difference is socially produced and often limiting to both sexes. Moreover, this social construction of gender difference holds important consequences in terms of power, because in the dichotomous construction of

> gender, power is located in the male, and the female is subjugated... The main point about discourses is that they carry power in their ability to position things and people as negative or positive, powerless or powerful.
>
> (Francis, 2000:19)

Understanding the specifics of identity must take into account that the active processes in the production of individual and collective identities always occurs within socially given conditions which include structures of power and social relations (Epstein and Johnson, 1998). Francis's observation that 'it does not necessarily follow that, just because people can choose which discourses to draw on, they do so in any completely consistent or coherent way' (2001: 75) is particularly relevant. It helps focus our attention on who has the power to construct gendered discourses and how the performance of gender is enacted in ways that are either comply with or resist these powerful discourses.

It is important to note that configurations of masculinity and femininity always operate within gender relations of power. Connell (1995) has argued for 'typologies' of masculinity of which *hegemonic* masculinity was the pinnacle; a concept used to describe the mode of masculinity that is culturally exalted. It is 'the most dominant or dominating modes of masculinity which claim the highest status and exercise the greatest influence and authority...Hegemonic masculinity is constructed in relation to women and subordinated masculinities...' (Skelton, 2001: 172), although used to define what is a 'real' man or boy it is not embodied within the individual but 'is the public face of male power' (ibid: 172). However, MacInnes argues (1998, cited in Francis, 2000) these typologies are purely notional concepts and may actually become reified and as fixed as the 'old' dualism of masculinity/femininity. He argues that none of the writers that use typologies of masculinity actually explains what these various masculinities hold in common other than the fact that they are all in possession of a penis. However, Connell's (1995) theorization, despite these criticisms, is a serious and well-argued attempt to understand the construction of men/masculinities and the

operation of *power* within gender relations, which is central to feminist concerns and to this thesis. This is pertinent to the following discussion in which I explore how ideas about gender shape the construction of technology, which in turn influences our construction of gender.

2.4.2 Feminist Theorizing and the Social Dimension of Music Technology

As the above discussion demonstrates, an important aspect of examining the social dimension of technology has been its ability to show how dominant groups assert and maintain power over other groups in their technological interactions, and is a central concern for feminist research. Murray (1993) argues that men's conscious control of technology comes from a deeper motive to protect a masculine reality which has been secured in the symbolic significance of technology. The gendered social relations in which technology is embedded powerfully construct gendered discourses about technology that often make it difficult for women to influence or participate in the development and use of technologies:

> Because social groups have different interests and resources, the development process brings out conflicts between different views of the technical requirements of the device. Accordingly, the stability and form of artefacts depends on the capacity and resources that the salient social groups can mobilize in the course of the development process...[therefore] what they overlook is the fact that the absence of influence from certain groups may also be significant... The almost complete exclusion of women from the technological community points to the need to take account of the underlying structures of gender relations. Preferences for different technologies are shaped by a set of social arrangements that reflect men's power in the wider society.
>
> (Wajcman, 1991: 23-24)

However, as Grint and Gill (1995) point out, we must not take for granted the idea that technology and masculinity go together. Women have contributed to technological innovations even if their contributions are often unacknowledged, so the notion of women's 'alienation' from technology is a product of the historical and cultural *construction* of technology as masculine. Understanding these gendering processes as they relate to music technology in educational settings powerfully demonstrates that it is not technology itself that is the 'problem' for women but the cultural context in which it is used.

As coordinator of a national teaching initiative for using new technologies in music, Whistlecroft (2000) drew on data collected from eighty-three UK Universities. She found that in departments where music technology or electroacoustic composition was taught, women made up only 18.5% of the staff. She noted that in universities where music technology was not a compulsory part of the course, women would often opt out, particularly from studio and composition work, and retention amongst women students was often low. She points out that one university with the most outstanding record of recruiting and retaining women in this area had four women on its staff of nine, including one composer. This suggests that the character of individual departments plays a crucial role in students' perceptions about music technology.

Women electroacoustic composers often comment on the 'macho' culture of the studio and the need to fit in. Commenting on her experiences of studying composition in Canada, Gayle Young observed that there was only one female member of staff and one female student (her) on the composition course and adopted a particular strategy in order to fit in:

> Being one of the boys was my way of dealing with it – I dressed like one too…I wore heavy workboots and huge T-shirts…Females students who can't easily fit in would do something else, just back out.
>
> (McCartney, 1995b: 4)

Another of McCartney's (1995b) respondents, Sarah Peebles, made a similar observation about her experience of being only one of four women in a composition class of thirty. Sarah noted that the women who stayed on the course did not identify themselves 'as women' and were often very isolated, not even talking to other women very much because they had to 'prove themselves all the time they were there. So they didn't identify themselves as women, so I didn't have the feeling that they were there, [even though] they were' (ibid: 11).

Examining the gender issues within the music technology classroom Caputo (1994) also argues that cultural assumptions about technology can result in valuing more 'malestream' forms of digital knowledge such as mastery of skills and rational, linear processes; forms of thought that produce a mechanistic way of thinking . Caputo argues that this means that girls either have to conform to these ways of thinking or remain silenced because girls' socialization encourages relational, analogic ways of knowing that do not fit with working with information in a digital format in the 'malestream' way she describes. Returning to Gayle Young's experience, 'fitting in' therefore not only requires women to adopt an identity that does not call attention to their femininity but also to adapt to 'masculine' ways of working in a digital culture that privileges male ways of knowing. As Caputo states 'girls are set up for failure on some level as they confront technology and are measured by a male norm' (1994: 89).

2.5 Conclusion

The above discussion immediately points up the central flaw of determinist orthodoxy for feminists when the trajectory of technology assumes an inevitability about its impacts on society – individual agency and resistance appear futile in the face of this technological juggernaut. However, paying attention to the *social* nature of technologies acknowledges that the adoption and development of a technology entails making decisions. Williams (1985: 146) is very clear on this point: 'The moment of any new technology is a moment of choice'. Technology is not predetermined but innovations are related to selections, preferences and choices made by *human actors,* not mechanical or digital systems. This is not to ignore that power may be implicit in these decisions but it does admit a level of agency that determinist thinking does not accommodate and helps us understand the ways in which artefacts may be configured, and by whom, in the operation of gender interests. Wajcman argues that:

> ...there is nothing inevitable about the way technologies evolve. Rather, technological change is a contingent and heterogeneous process. Different groups of people involved with a technology can have very different understandings of that technology, including different understandings of that technology [and] of its technical characteristics. Thus users can radically alter the meanings and deployment of technologies.
>
> (Wajcman, 2004: 37)

Recognizing that there is nothing inevitable about technology, and that meanings and uses can be redefined, provides 'a more realistic and useful basis for feminist action, precisely because it resonates with the ambivalence that women experience in encounters with technology...[it] helps to explain the tenacity of the equation between masculinity and technology' (Faulkner, 2001: 80-81).

This chapter has provided a detailed discussion of some of the main social theories used to discuss technological innovation and development and their relation to gender and music technology. Having commented on the tenets of technological determinism and its powerful hold on current thinking about music technology, I suggested that, perhaps unwittingly, there is a tendency in current discussions about educational music technology to see digital systems as innately democratizing and transformative. The focus lies with the technology as a *thing* and not the social relations into which that technology is incorporated. There is little or no social context in these discussions – the technology (and not the social context of its use) determines classroom compositional practices and, as such, the orthodoxy of technological determinism is invariably invoked. Turning towards a socially embedded theory of technology acknowledges the role of human agency and highlights the dialectical relationship between technology and society, as mutually constitutive.

CHAPTER 3: GENDERED CULTURES IN THE MUSIC TECHNOLOGY CLASSROOM

3.1 Introduction

This chapter discusses the processes and practices that produce gendered cultures within the music technology classroom through an examination of the institutional features that frame the educational environment within my four participating schools. These features include how pupils learn about technology, the repertoire of teacher and pupil talk, its effect on pupil confidence and the issue of male control of technological knowledge. I discuss how the articulation of technology with masculinity and femininity engenders certain attitudes, forms of interaction and types of organization and the extent to which pupils learn to take up or, in some cases, resist these institutional features.

Developing an understanding of these institutional cultures is fundamental to this study and provides the context for my discussion about the compositional process in Chapter 6. As Holloway and Valentine state:

> ...computers come to mean different things in different schools... the different ways that these schools have incorporated ICT into their institutional agendas and practices demonstrate that technology has no pre-given effects, but that its meanings and implications emerge as computers and social actors come together...
>
> (Holloway and Valentine, 2003: 42)

Holloway and Valentine's observation is certainly borne out in my analysis of the institutional practices in operation within my research schools and the meanings that each construct around music technology. As I hope to demonstrate, the research methods I used enabled me to uncover a range of differences and similarities in classroom practices all of which produced, to a greater or lesser extent, gendered forms of interaction, types of talk and technological spaces. To frame this discussion, I will begin by considering the attitudes and values students

bring into school regarding computers and computer software and examine how this affects their attitude towards learning about music software in the classroom.

3.2 Learning technology

Although research has shown there is little difference between boys and girls regarding the presence of computers in the home, boys are more likely to have *personal* ownership of computers than girls and engage in more frequent use of it (Facer et al, 2003). As Sefton-Green and Buckingham (1998) note, students bring into school a body of knowledge, skills and competencies derived from their out-of-school experiences of computers and these 'informal' cultural competencies feed into the formal curriculum. Where boys make use of music technology at home their knowledge, when transferred into the classroom, appears to be accorded value. This feeds back into the masculine culture of a setting that appears not to accord similar status to girls' technological expertise further strengthening the construction of masculinity as aligned with knowledge, power and culture.

What students bring into the classroom is often informed by the types of activities they carry out at home with girls more likely to use the computer as a word processor for text-based activities, and boys using it more for surfing the Net and game-playing (Orr Vered, 1998; Sefton-Green and Buckingham, 1998; Casas, 2001; Facer, 2003). A similar situation was found in Colley et al's (1997: 125) study of gender and ICT in music education whereby girls were said to treat technology as a tool to help them produce music to the best of their ability but boys were more likely to play around with the technology. They suggest that this could also be a manifestation of a style of working that reflects boys' and girls' out-of-school experiences with games software. As one teacher from their study commented, 'if there's a knob boys will turn it, if there's a switch they'll press it' while another observed 'it's always the boys that are pressing the buttons on the

keyboard... If you watch them in the keyboard lab they'll be banging away at it, while the girls are actually trying to make music' (ibid: 125).

Girls are more likely to view those who spend large amounts of time using computers (usually boys) as 'geeky' and incompatible with 'having a life'. As such, being seen to take an interest in ICT poses a threat to their identities and girls assert that they would not tell their peers they were into computers for fear of being seen as a 'sad geek' or a 'boffin' (Holloway and Valentine, 2003). This reluctance to be associated with 'geeky' boys can actually reinforce anxieties about being able to use computers as girls may actively resist using the technology altogether rather than be stigmatised as a 'dunce'. This fear of failure is often one reason given by girls for not using music technology (Comber et al, 1993). Girls, therefore, are in a double bind – their feminine identities are at risk if they *do* engage with it and yet, if they do not, they are left feeling inadequate in a classroom culture where knowledge of ICT is highly valued. In contrast, ICT reinforces boys' sense of masculine identity - an affirmatory technological identity with which many girls do not feel comfortable.

However, it has been suggested that an overtly technological identity can also be difficult for boys. As I mentioned earlier, they too can be labelled 'geeky' or 'nerdy' by other pupils, especially by other boys who may also equate this with being effeminate or 'poncy' (Holloway and Valentine, 2003) but I could not find any examples of this in my own study. In fact, having good technological skills are implicated in the construction of an acceptable and desirable heterosexual 'macho' masculine identity that is validated by teachers and pupils at Old Tech Grammar, New Tech Comp and Arts College, which Gemma's comments about Robert illustrates:

GEMMA: He was taught by someone, I think it was Mr X [now left], and he was taught the sequencers or spent a lesson with Robert and taught him how to do it because he doesn't play an instrument and he spent hours doing one of his compositions [...] He

> sequenced it and it was *so* good! He said, his mum timed it over a period of three or four days; he spent pretty much four days solidly working on it.
>
> (*GCSE girl, Old Tech Grammar*)

Researching a group of Norwegian male computer hackers, Hapnes and Sorensen (1995) noted that these hackers employed a certain learning strategy that involved a lot of tampering with the computers and trying things out directly on to the machine. The computer was a thing to be manipulated and a hacker's sense of identity was connected to a high degree of competition between hackers who took great pride in setting personal records for how many hours they could spend programming without sleep. This construction of masculinity is not a simple reflection of a general masculine culture but is the product of efforts to construct networks of men and machines that exclude women and femininity. These observations suggest that boys are more likely to adopt a more 'hands-on', 'doodling' approach to working with computers and is compatible with the types of computer activities they engage with in informal settings. Girls, on the other hand, are less likely to engage with computers in this way, partly because their preferred activities require different types of interactions and because being seen to be interested in computers poses a threat to their femininity.

Acknowledging the different forms of interaction and working styles boys and girls bring into the music technology classroom is important in understanding how students engage with and learn about unfamiliar music software packages. I raised this issue in my student interviews when asking about the extent to which they receive 'formal' training when working with music software. This is an area largely ignored within discussions of music technology and seems rather remiss if students are expected to view the computer 'as a tool for realizing musical ideas' (Folkestad et al, 1998:94) but who may have insufficient knowledge of the various software programs schools expect them to use. Yet, this seems to be a common scenario in the schools involved in this study. Students are often expected to engage with music software with only the most rudimentary overview

of how to use it; an ad hoc approach to music technology that may be especially detrimental to female composers. Some music educators have acknowledged this by providing structured introduction for girls but this is by no means common practice (Colley et al, 1997).

Asked whether they had been given any structured lessons on how to use the various types of software, it was noticeable that, although many students in my study insisted they had received none or very little, this appeared less problematic for the boys who were more likely to express confidence to try things out anyway. Boys appeared more inclined to adopt a 'have a go' approach to the computer technology. They appeared less concerned when things went wrong and were more likely to assert that they tended to pick things up as they went along. Given the reported higher rates of computer use amongst boys in the home, this is perhaps not surprising: gender differences in access and use have serious implications as it has been shown that greater exposure to and experience of using computers is related to more positive computer attitudes (Levine and Donitsa-Schmidt, 1998 cited by Colley and Comber, 2003).

Gemma's experiences of composition and learning about the basic score-editing program 'Music Time Deluxe' (see Glossary) software suggest that there is an underlying assumption that students already know about the software, or at least can pick up the requisite knowledge as they go along:

GEMMA: Well, I borrowed the Music Time Deluxe software from school. My parents haven't bought it [...] I think it was in Year 8 I had a different teacher who's left now and he used to go round and um when they first bought the computers and he sort of went round and explained the basics to us but, 'cos we were in Year 8, we didn't really use them a lot and so now, I can only use Music Time Deluxe and I think a couple of my friends are like that. He [Mr Clarke] talks about the others like Cubase and stuff but we're just not sure how to use them.

VA: So you've not actually had structured time on sort of 'this is how you do...'

GEMMA: No, we get sent away and say, they say 'do your compositions' so

> we… [trails off]. Everyone's asking [for help] at the same time. It is quite annoying […] little more help I suppose is always a good thing.
>
> *(GCSE girl, Old Tech Grammar)*

Joanne states that the 'basics' were explained to her in Year 8 but she had not used the software regularly since then which suggests that her understanding of the program was still quite unsophisticated, nor does she appear to have been introduced to other types of software which she stated her teacher often talked about with other students. Her comments also imply that she has not tried out any music software other than Music Time Deluxe although, in addition to the two mentioned above, the students also have access to Cakewalk, Evolution Audio and Cubase (see Glossary).

In contrast, where boys do acknowledge some degree of formal instruction about inputting notes and so on, they would continue to assert that they could, however, work things out for themselves and seemed to take a certain pride in this ability to display their technological know-how, and this was a strong theme in their responses as illustrated by the following:

> **EDWARD:** Um, well Sibelius I've had for quite a while…my parents bought it for me so I've been using that for a while now and I can do a lot on that but on the MIDI set-up like Cubase, things like that, I mean I've got that at home and use it here but I'm having to teach myself as I go how to use it.
>
> **VA:** So when you say you teach yourself as you go, what kind of training were you given to use the equipment at the start of the course?
>
> **EDWARD:** Um, well, like, we weren't given any basic training: 'oh, this is how you…' Well, I suppose you are at the beginning of the school but then, well 'cos I've got a kind of manual on the computer, so I can look stuff up on that as well, it came with it.
>
> *(A Level boy, Old Tech Grammar)*

***

VA: What kind of training were you given on the software here when you started your course?

ROBERT: We were told how to use it, how to transpose notes, how to input notes, how to save the documents and all that stuff. I sort of like, I work stuff out as I go along. I find it quite easy to just like find stuff out by myself. I don't read the instruction manuals or anything.

(GCSE boy, Old Tech Grammar)

These responses were echoed by Liam at Crossways Independent:

VA: OK. You say you feel confident using technology. What do you think you're particularly good at?

LIAM: Well, I can hold a mouse! I dunno really. I'm not sure really what you can be good at…it's kind of annoying because a lot of the time it doesn't do what you want it to do but, it has to go a long way around doing something but, um, in general, as long as you've been told what to do you just sit down and do it.

VA: So you don't have any problems?

LIAM: No.

VA: Right. So just tell me what kinds of things, how were you taught to use the technology?

LIAM: I was just, I dunno. I kind of picked it up myself really. You know, it's fairly easy. I can, I mean I know all of the short cuts, everything now. But no, I mean I can do it really fast. You just sort of learn as you go along.

VA: And what about your classmates? Do you ask any of them if you get stuck?

LIAM: No, because I never get stuck at school.

(GCSE Boy, Crossways Independent)

Liam makes light about how he learns to use the technology. Although it is apparent that he has received some help in how to use the software, evidenced by his statement 'as long as you've been told what to do you just sit down and do it', he downplays this. He is keen to present himself as someone who learns about technology by just picking it up, without apparent effort or concern. As he states, his ability to 'hold a mouse' is sufficient qualification for being 'good' at

technology. Robert too acknowledges that he has received some degree of 'formal' learning but again, he stresses the ease with which he can work things out for himself and takes a certain pride in his claim that he does not have to resort to using the manual. These boys were keen to portray themselves as competent users who could learn about technology with little formal support. However, as one girl observed, even when boys were finding things difficult, they were less inclined to show it:

GEMMA: Um, we're [the girls] all about 'ooh, what's going on?' I think the boys do muck about and if they are struggling they don't show it but we do; but they don't get their work done in time.
(GCSE girl, Old Tech Grammar)

In light of the validation of their technological prowess it is perhaps unsurprising that the boys at these three schools tended to adopt a more 'have a go' approach, appeared less concerned when things went wrong and were more likely to assert that they tended to pick things up as they went along. Only a handful of girls within the four schools stated they had a similar approach to learning about technology, sharing the boys' 'have a go' approach, although they were happy to state that they would refer to computer manuals if necessary. Their approach to 'having a go' seemed for pragmatic reasons in contrast to the boys' statements about their approach to learning technology, which appeared to be grounded in their sense of themselves as competent technologists:

VA: If you have a problem with the technology what do you do?
LISA: I'll press lots of buttons to see what happens.
(GCSE girl, Arts College)

***

VA: Were you given much training in how to use it, how to do certain things?
DIONNE: No, not really. It's pretty straight forward. There used to be a book [the manual] there so I use that if I get stuck.
(GCSE girl, Crossways Independent)

***

VA: Were you taught how to use the software?
LINDA: Well no. We had a sort of little half hour thing about how to use

it at the start of our course but that's all.
VA: So how did you learn to use it?
LINDA: Well. I look up the help bit and stuff. I usually work it out myself.
(A level girl, Arts College)

The girls cited above were all students at either Arts College or Crossways Independent. This is significant because, although both schools had quite different levels of ICT access and expectations about the role of music technology in composition, technologically oriented interactions did not dominate the music classroom. This contrasts sharply with the situation I observed at Old Tech Grammar and New Tech Comp where I noted that technologically oriented interactions were in the majority between male teachers and male pupils. At Arts College and Crossways Independent there appeared to be less emphasis on technological expertise and therefore, in contrast to the overtly technological identity encouraged and prized at Old Tech Grammar and New Tech Comp, girls appeared more likely to find ways of reconciling a positive identity that enabled them to develop a confident and experimental mode of learning about music technology.

This seems of particular significance in light of the rather curious observation made by Savage and Challis (2002) - extremely enthusiastic champions for educational musical technology - who emphasize how new technologies help develop students' creative ideas rather than having to 'worry' about the intricacies of the software:

> Whilst in the first instance there was a focus on effective use of software and hardware, and in developing the necessary technological skills, students were thrown in the creative deep end with some of the technology. They had to sink or swim with it...Many rose to the challenge and quickly showed their creative flair through appropriate uses of the software.
>
> (Savage and Challis, 2002: 13)

Much is made of the 'many' but no mention is made of the implied few who were unable to 'rise to the challenge' of grappling with the software. Not only are we left in the dark about their ability to show 'creative flair' but we are given no information about their gender either. One can only surmise about the challenges *they* faced if they did not have the technological skills to enable them to show their creative flair 'through appropriate uses of the software' nor what happened to those few who sank rather than swam. This is a significant omission in light of my findings. Although a number of girls in my study stated they were comfortable with the slightly ad hoc approach the schools took to learning about new software, these girls were in the minority. Most girls argued for more formal training in the use of music programs at the beginning of their courses. This has also been highlighted by Colley et al (1997) who note that some teachers who taught music in mixed groups recognized the fact that, in order to increase confidence in their female students, it was necessary to provide a structured introduction to new technology in a step-by-step approach. As the above discussion illustrates this is particularly pertinent given the ways some girls learn to use technology.

However, this can play into the hands of gender ideology that equates girls' greater 'need' for more help and reliance on the teacher's guidance with the assumption that they are either less gifted or less able than their male counter-parts. These parallels can be found in teachers' attitudes towards boys' and girls' composing whereby boys' expressed independence from teacher instruction marks them out, in the eyes of their teachers, as being more creative, imaginative and spontaneous than their diligent, unimaginative, conformist female classmates (Green, 1997). The teachers in Green's study acknowledge that girls work harder but state they are more interested in 'getting things right', better at 'exercises' and rather conservative. The boys, on the other hand, are said to have more 'natural ability'; as one teacher noted '...much of the creative, adventurous composing comes from the boys' (ibid: 197).

3.3 Processes and Practices of Gendering

The following discussion explores these perceptions further with regard to the production of gendered cultures that leaves many girls 'silenced' and expressing a lack of confidence within the music technology classroom. This contrasts with the greater expressions of confidence and feelings of technological control by the boys engendered by an overtly masculine technological discourse produced at Old Tech Grammar, New Tech Comp and, to a lesser extent, Arts College.

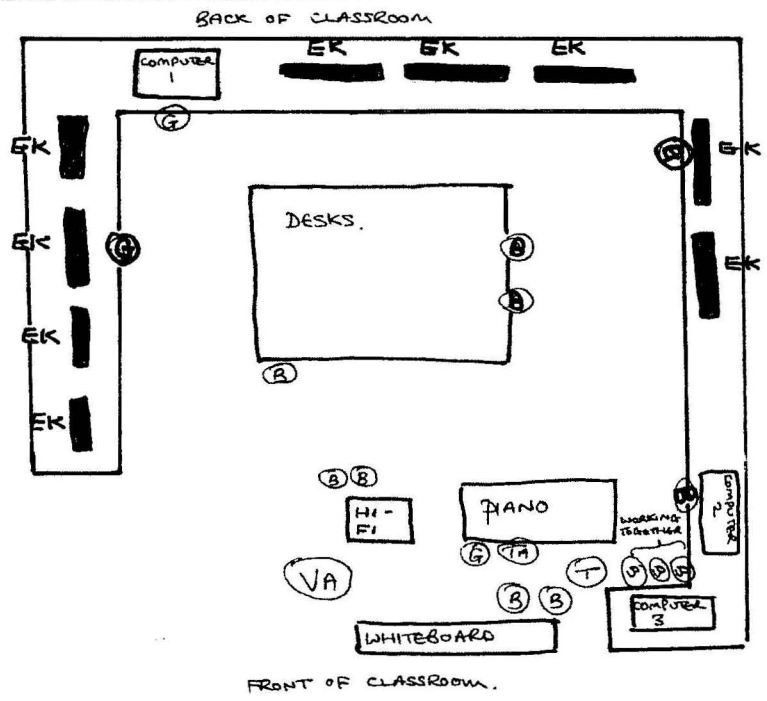
3.3.1 Technological Talk

In this section, I explore how 'technological talk' between teachers and pupils and amongst the pupils themselves contributes to noticeably gendered interactions in the classroom and examine how this dominant technological discourse positions males and females differently with regard to technology. Of the four schools, Old Tech Grammar and New Tech Comp represent the extremes of music technology provision: the former had a 'state-of-art' music suite that had been in use for a number of years while New Tech Comp had only a 3:1 pupil-computer ratio and the shortest ICT history of all four schools. My observations at Old Tech Grammar took place in the music ICT suite where a range of software was in use. New Tech Comp only invested in technology at the beginning of the academic year of my visit and until that time, the department had access to only one computer. Throughout my first few classroom observations, I began to discern a marked difference between the schools regarding the amount and type of technological talk that took place in the lessons. This type of talk dominated the classroom interactions with pupils at Old Tech Grammar and New Tech Comprehensive, was less overt at Arts College and was very rare at Crossways Independent. However, it was noticeable that both Old Tech Grammar and New Tech Comprehensive engaged in a technocratic discourse that was oriented towards the perceived interests of the boys, with the male teachers leaving many of the girls positioned outside of the culture generated by these types of discursive

practices.

During a GCSE composition lesson at New Tech Comprehensive (lasting fifty minutes), the pupils were scattered about the department, some in the music room where the majority of the computers were located and others dotted around various practice rooms. The teacher spent his time working with any student that asked for help in completing their composition coursework, dividing his time between the main music room and three practice rooms (one of which contained a computer). Having noted what the pupils were doing in each room (two girls and one boy were working independently at pianos in practice rooms and two boys were working at the computer in the adjacent practice room)[18] I returned to the main music room. Having moved around the room to see what each pupil was doing, I then positioned myself near the front of the room where the majority of the pupils and the teacher were located (see Fig 2 for layout).

Fig 2: Layout of Main Music Room, Hill View (taken from field-notes, GCSE Class, Wednesday 10th April 2003)



Key

VA = Researcher
B = Male Pupil
G = Female Pupil
T = Classroom Teacher
TA = Teaching Assistant
▬ = Electronic Keyboard

[18] There were normally fifteen boys in this class but on this particular day one was absent.

This room was where most of the compositional activity was taking place and where the male teacher spent his time for the remainder of the lesson. During this time, I noticed the teacher did not interact with any of the female students; he worked with any pupil that required his help but none of the girls requested it. Throughout my observations, the boys monopolized the computers, either alone or in groups, with girls mainly using the electronic keyboards around the outside of the room with their headphones on. On one occasion, a boy using a computer called upon another boy in his class who was not composing at a computer to help him 'find' the drum-kit – he had apparently 'lost' it. The boys worked together briefly, until they were able to relocate it. Throughout this lesson other boys were constantly asking the teacher for help, for example, wanting to know how to put their compositions onto minidisk or how to solve technical problems regarding achieving the correct balance between certain instruments using the sequencing software Cubase. At one point, three male pupils were working at a computer and it transpired that they were trying to solve a problem with one of the boy's compositions. He was unhappy with the sound quality and the 'mix' of the sounds but did not know how to improve it. The balance of the tracks was incorrect so the teacher then showed the pupil how to adjust the volume of each instrument on the track. During this lesson, only one girl worked at a computer; she worked alone and did not ask for help or advice. She was the only girl observed composing using music technology during my observations at New Tech Comprehensive (both at GCSE and A Level). The majority of interactions I observed between the teacher and the male pupils consisted of 'technological talk' and practical help in using the technology which none of the girls participated in.

Due to the ways in which the girls were working (by not demanding attention, or asking for help and generally being quiet), they did not draw the teacher's attention towards them, and neither was my attention drawn towards these girls, for similar reasons. Looking back at my field notes, I can see that my attention was focused on the male pupils' interactions near the front of the class (as laid out in Fig 2); I was influenced by their 'noisiness' and sheer physical presence (seven

of them were clustered around the teacher and the computers). Although the girls were also making use of music technology, either on the computer or by using the electronic keyboards, I am aware that, in similar ways to the teacher, I was drawn towards the 'dominant' group of boys who I perceived as more 'technological' because of their discernible technological interactions and language. Because the girls did not noticeably participate in any technological talk I too, like the teacher, rendered them largely invisible and was culpable in their construction as 'non-technologists'.

Similarly, at Old Tech Grammar, the majority of teacher/pupil interactions involved technologically focused discussions, none of which involved female pupils. During my first GCSE observation at the school, the pupils began the lesson in the music room where each student was seated in front of an electronic keyboard. Having taken the register, the teacher instructed the students to continue working on their coursework composition assignments and sent them into the music suite next door. The teacher was largely absent throughout the remainder of the lesson as he was busy trying to organize the rehearsal and performance schedule for the Year 11's GCSE practical performance exam. Another male teacher entered the room briefly and one of the boys asked him a question but the teacher instructed him to 'read the manual' and then left the room. The students worked quietly at their workstations with the exception of three girls. Although they were not composing together one of the girls, Vanessa (who had completed her compositions) was talking to Gemma about how she could change key and they worked together for about thirty minutes with Hannah occasionally chipping in to ask for Vanessa's advice.

On subsequent visits to this class, the designated teacher was present and I became aware that he spent a significant amount of time talking about the hardware/software aspects of technology. The music suite was quite an informal space with pupils coming in and out during the lesson. During the second GCSE observation, two A level students came into the room and began talking to the

teacher about problems of 'overdubbing' using the multi-track in the small recording studio adjacent to the suite. The teacher dealt with this enquiry and then engaged in two further discussions, one about recording onto a minidisk player and another about transferring music files to floppy disc, all with male pupils. He then went over to one of the male pupils and embarked on a discussion about the software 'Proteus'[19] and how the pupil might use this in his work.

Culley (1988) noted the difficulties of deconstructing a gendered discourse of technology when men have more power than women to define and circumscribe talk and interactions. She observed in her study of secondary school computer clubs that fewer girls than boys took part in these optional activities. The computer rooms were generally thought of as 'male' territory, the girls stating that the boys' attitudes and behaviours often made them feel uncomfortable. To compensate, schools provided 'girls-only' time (often supervised by a non-specialist female teacher) but this led to the open sessions effectively becoming boys-only sessions (run by a qualified male computer teacher), which had the effect of further reducing access and teaching quality for the girls. The above reflects what many researchers have found: boys frequently get more attention and occupy more of the teacher's time. Lesson content and discussion are geared towards boys in order to deal with their greater demand for attention and social control (Spender, 1982; Acker, 1994) and this is further compounded when ICT becomes the focus of classroom interactions.

Citing the 2001 Ofsted report in which boys were seen as doing less well in science because of their relative weakness in basic communication skills, Warren (2003) notes that changes to the curriculum and teaching strategies were implemented that appear to favour boys. He argues this invokes what he calls 'particular ideas of masculine practice in more 'active' forms of pedagogy' (ibid: 205) or more prosaically 'boy-friendly' methods. Ofsted's suggestion for

[19] 'Proteus' is a sound module designed for use with a PC and can be used either as a stand-alone instrument or with a sequencer.

drawing out boys' 'natural ability' included greater use of ICT in literacy work and more 'instrumental' uses to support writing rather than 'expressive' forms. Warren says this suggests 'a dichotomous distinction between the 'instrumental' male and the 'expressive' female (ibid: 205), again reinforcing 'common-sense' views about the differences between males and females, differences that produce and maintain unequal power relations between men and women.

3.3.2 Confidence and Control

Having highlighted how male pupils and teachers dominate and control technological talk in the classroom, in the following section I go on to examine its impact on boys' and girls' different levels of confidence. I suggest that the powerful masculine-technology discourses invoked at Old Tech Grammar and New Tech Comprehensive may be a significant contributory factor for girls' lower levels of confidence within these two schools. This also incorporates a discussion about power and control as they relate to gender. It appears that these male-dominated technological interactions are not comfortable spaces for girls and, compounded by their limited access to the technological language involved in these interactions girls may be positioned *outside* the culture generated by the male teachers and pupils making them either unable or unwilling to contribute to these technological discourses.

Wajcman (1991) has suggested that women attach different meanings and values to technology and these enter into our understanding and construction of gender identity. Masculinity is constructed through notions of technical competence while the idea that women lack this technical competence becomes part of feminine gender identity. Henwood (1993) argues that levels of competence and confidence relate not only to how students acquire technical skills but that they must own that acquisition at a more subjective level, as part of their overall identities. However, this 'ownership' of technical skills is inhibited by their exposure to constructions of gender-technology relations that posit women as

'outsiders' within technological cultures, as the previous discussion regarding 'technological talk' highlighted. Computers are often said to be more attractive to boys because computer culture is more consistent with traditional types of male activities (Kiesler et al, 1985; Sofia, 1998); a culture that often repels girls. Therefore, although the computer itself is not inherently gendered, the culture around it is. Turkle believes that women are not phobic about computers but 'reticent' because the computer becomes a 'personal and culture symbol of what a woman is not' (1988: 41).

Examining the cultural landscape in which computing occurs enables us to better understand how it shapes our understanding of what computing 'means'. Huber and Schofield's (1998) research into computer use in Costa Rican primary schools exemplifies this point. They observed that the teaching within these schools was heavily gender stereotyped and this reflected Costa Rican society, invoking what they call a 'machismo-marianismo' complex. Males were expected to excel intellectually and were allowed to dominate social relationships within the classroom. Girls on the other hand, were expected to be submissive, pious, decent and more interested in spiritual and moral matters in preparation for their social role as housewives and mothers – over 75% of Costa Rican women do not work outside the home. Huber and Schofield found that these cultural expectations reflect children's attitudes to computers: boys were much more enthusiastic about computer technology while girls, in comparison, appeared less confident and were less likely to use them during non-teaching time. These observations show how the meanings created around computer technology reflect cultural expectations: males and females are educated with different social roles in mind, which, in turn, legitimate differential expectations of their intellectual capabilities, behaviours and gendered subject positions.

Colley and Comber (2003) have reported that boys are more confident users of technology than girls and that girls are more likely to under-estimate their computing ability in relation to others; girls are also more likely to report greater

feelings of incompetence with computers than males (Schumacher and Morahan-Martin, 2001). Boys show higher levels of self-assurance and there is a *perception* amongst boys and girls that boys generally know what they are doing reinforcing a cultural stereotype of the competent male computer user (Comber et al, 1993; Colley et al 1997), a perception that was evident from the student responses in my study. During their interviews, when asked whether they thought there was a difference between boys' and girls' ability to use music technology, the responses were overwhelmingly in favour of the boys:

ROBERT: I think it's the boys who are better at using the technology in our class. I don't know why. The girls seem to always wonder how to do stuff. Like [female student], she doesn't even know how to put the floppy disc in the drive to make it work properly. She must be like not computer literate.
(GCSE boy, Old Tech Grammar)

STEVEN: Um, I think there is possibly a bit less on the girls' side cos they ain't used it as much like me and Robert. So I don't think it's just cos they're girls.
(GCSE boy, Old Tech Grammar)

CRAIG: It's probably the boys, most of the boys. Not all of them but, on average, they would be better musically in our class because we've got two sequencers and none of the girls are sequencers. Maybe the boys are a bit better at using computers and musically.
(A Level boy, Old Tech Grammar)

KAREN: Boys, probably because I think Luke's the best. Yeah, generally the boys.
(GCSE girl, Crossways Independent)

IAN: Well, I'd actually say the boys because Karen doesn't really use it and there's only Dionne. She's good and Luke's good and Nicholas as well, so I'd say the boys. I don't know [hesitates]... it's kind of hard because it's 50-50 really. So I don't really like want to say the boys or girls but if I had to choose one I'd have to choose the boys.
(GCSE boy, Crossways Independent)

A study carried out into the use of ICT in the Scottish music curriculum stated that the teachers in their study did not perceive any gender differences regarding

levels of confidence. However, they observed that the use of technology had increased access for boys far more than for girls (Byrne and Macdonald, 2002), an observation supported by earlier studies (Colley et al, 1993). However, it is important to point out that just because teachers did not notice any gender differentiation there were no gender differences. Byrne and Macdonald's study was carried out using only focus groups of teachers but without obtaining other forms of data, such as classroom observations. Consequently, I would suggest it is difficult to substantiate teachers' assertions that gender was not an issue without supporting evidence gleaned from the music classroom.

Pitts and Kwami (2002) also stated that they noted little of the antipathy that had been expected in light of other research towards girls' use of music technology (Armstrong, 1999; 2003). However, they do not reveal information about whether or not the only available mode of composing was via digital means only or whether there were acoustic alternatives. They also skate over what seems a highly significant point when they note that one female pupil was 'particularly disillusioned with the ICT process, preferring the immediacy of the piano and its almost physical contact with the player to the virtual world of the MIDI keyboard' (Pitts and Kwami, 2002: 67). I will return to this important aspect of computer-mediated composition in Chapter 6 for a full exposition of its significance but suffice to say, this pupil's comment hints at unexplored gender issues. As I have suggested elsewhere, it is not necessarily antipathy towards music technology but towards a *style* or *mode* of composition. It is the technological focus and emphasis on technological control that girls are reacting to (Armstrong, 2001: 37). As such, the observation made by Pitts and Kwami (2002) may say less about the *children's* attitudes towards music technology and more about the culture and organizational arrangements of that classroom which were not explored in their paper.

Ho's (2004) recent investigation into gendered attitudes towards information technology use in music classrooms in Hong Kong also suggested that there were

few gender differentials between boys and girls and that levels of confidence and interest were the same for both. Consistent with other studies, however, was the observation that there were more positive responses for music technology from the primary school girls than from secondary school girls. Colley and Comber (2003:161), in their study of age and gender differences in computer use in secondary schools, also found that younger pupils reported a greater liking for computers and older girls tended to compare their computing ability less favourably with boys of the same age than the younger groups. However, despite asserting that there were very few gender differences, Ho (2004) does make a distinction between girls and boys' preferred uses of music technology. Having divided classroom music activities into four categories: appreciation, performance, composition and 'knowledge' (theory and music history), Ho then states that 'girls were more successful in listening and performance, whilst boys were more successful with composition and literacy' (ibid: 153). In her summary, she reiterates this same point but this time employing the term 'preferred' instead of 'successful' (ibid: 156). There appears to be some linguistic slippage here between 'successful' and 'preferred' which is somewhat problematic because Ho has inadvertently conflated an evaluative term with one of perception. Unfortunately, this appears to produce a dichotomous distinction between girls' possible 'lack' of creativity compared to boys; an important point that is not developed or examined:

> This study supports previous research conclusions concerning girls' preference for listening and performing, and boys' inclinations towards music history and theory, and the introduction of instruments (e.g. Green, 1993, 1997...). This raises questions concerning whether girls lack musical creativity and self-expression and whether boys are more interested in composition and theory. Certainly girls are keener than boys on performing activities...and boys seem less interested in singing...Perhaps these preferences underlie gendered differences between preferred uses for IT.
>
> (Ho, ibid: 158)

It is very difficult to understand how girls' preferences for listening and performing is suddenly interpreted as a possible lack of musical creativity and self-expression, especially in the light of having cited Green's (1997) work which provides a very sophisticated discussion of the possible reasons behind gendered differences in the music classroom. Ho's latter observations require greater discussion than has been provided. She made a similar observation regarding boys' greater interest in computer music in an earlier article but did not enter into any critical discussion of why this might be so having explicitly stated that her study provides no rationale 'for the inclusion of feminist studies to explain the different preferences of boys and girls in musical learning' (2001:43). Unfortunately, this lack of theoretical underpinning and critical discussion may reproduce gendered hierarchies that place girls' uses of music technology (for listening and performing) as inferior to that of boys (for composing); a situation which many feminist musicologists have laboured to rectify but has been monumentally side-stepped in Ho's discussion.

In comparison to Ho's findings, having collated the results from the eighty-eight completed questionnaires (41 girls and 43 boys) in my study, it was significant that the question 'Do you feel confident using music technology for composing?' elicited 'yes' from 90% of the boys compared to only 48% of the girls. It was also interesting to note that the lowest levels of confidence were expressed by girls from Old Tech Grammar, which had the best equipped music technology suite and unlimited access to the equipment – lack of access being one of the reasons often given for girls' lower levels of interest. As Colley et al (1997:126) note, school type significantly influences the confidence of female pupils in working with music technology. Many of the girls felt unconfident using the technology stating that it was complicated and unpredictable:

VA: Now, the first thing is you say [on your questionnaire] that you don't feel very confident using this stuff. Why is that?
NINA: It's complicated and it mucks you about sometimes. If you do the

slightest thing wrong it will close down and not say where your work is.

VA: Did you have a lot of tuition before you starting using it?

NINA: No. Just sort of like straight on there. So, it is a bit difficult to use at first but you get used to it but it's all the little things. You've got to do specific commands for each thing and it's quite difficult finding them because we don't get given the instruction booklet. It's like, 'There's Sibelius, get on with it'.

VA: Right, so you have to use help functions and things like that?

NINA: Yeah. We'll just go through all the menus. 'Cos sometimes the help functions just sort of like drive you round in circles. They don't really answer your question so we have to figure it out for ourselves.

(A level girl, Old Tech Grammar)

**

GEMMA: Because you can play it into the software but it's just the rhythm is very rigid in the software and if you just veer off the rhythm a bit it goes completely wrong and comes out completely wrong note values and it looks horrible and you think 'Oh my God, what have I done here?'

(GCSE girl, Old Tech Grammar)

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CAROLYN: I'm sort of confident but I still find areas where other people would be off and away where I'm still not quite certain of myself. But I think because it's a whole new thing to me. I've had a bit of a problem with the layout of one of my compositions just because, don't know why, I put a guitar line right at the beginning of the instruments I was going to use and once, I deleted it completely. It threw all the, well, it's now got very big gaps between some and others are very close together on the page and it looks slightly odd.

VA: No obvious reason why that happened?

CAROLYN: No and I can't figure out how to change it.

(A Level girl, Crossways Independent)

On the questionnaire I asked pupils to suggest what would help them gain confidence in using music technology and large numbers of girls made comments such as 'having instructions available at school', 'Tuition. How to use the different programs, what effects can be achieved etc' or just 'Having a manual to look at', comments which reflect the observations I made earlier regarding girls'

approaches to learning about technology.

These interview comments contrasted sharply with the male pupils who were extremely confident about their ability to engage with technology, often emphasizing its 'simplicity':

JACOB: I'm quite confident at most of it. I find it quite easy to pick up a new piece of software and start using it. Um, because I enjoy it as I'm probably better. I am, I think, fairly able to do most things.

(A Level boy, Old Tech Grammar)

**

VA: Now. who's the best person in the class at using the technology?
ROBERT: Me!
VA: So what do you think you're particularly good at?
ROBERT: I'm just good at computing in general. I'm trying to create my own video game at the moment. I'm just computer literate. Is that how you say it?
VA: Right. So what kind of training were you given on the software here when you started your course?
ROBERT: We were told how to use it, how to transpose notes, how to input notes and all stuff like that. I sort of like, I work stuff out as I go along. I find it quite easy to just like find stuff as I go along. I find it quite easy to just like find stuff out by myself. I don't read the instruction manuals or anything.
VA: If you do get stuck…do you ever get stuck?
ROBERT: Um, not now. Maybe in Year 9 I might have got stuck once or twice. We only just got the computers then so I didn't know anything about them at that time but now I literally know how to do most things.
VA: Do you ever ask for help?
ROBERT: I work it out myself.

(GCSE boy, Old Tech Grammar)

**

VA: So you say you feel quite confident using technology. What do you think you're good at?
LIAM : Well, I can hold a mouse! No, I dunno really. I'm not sure really what you *can* be good at.

(GCSE boy, Crossways Independent)

**

VA: You say (from the questionnaire) that you feel confident using technology.

GEORGE: Yeah, like playing in the notes and stuff; that's about it really.

(A level boy, New Tech Comprehensive)

**

PATRICK: Well, it's simple to use. It's got all the sounds, any sound you want.

(GCSE boy, New Tech Comprehensive)

This contrasts with Nina's comments that the smallest mistake can lead to work being lost and there seems to be a real concern about her lack of control over what the computer does: 'it', the computer, closes down and then will not say where the work has gone. In addition, Nina's articulation of lack of confidence is compounded by the fact that she has limited knowledge about the software help functions; a situation also experienced by Carolyn at Crossways Independent. Valentine and Holloway cite a similar example by two of their female respondents who recount how a girl on one of the respondent's work experience placement accidentally wiped off some important data from a computer merely by pressing 'a button with her little finger' and that '... it just wiped everything'(2001:70). Valentine and Holloway suggest that this implies a lack of responsibility for the loss of the document attributing blame to 'it', the computer for its loss. They suggest that girls' reluctance to engage with technology is not just about having the confidence to 'control' the computer but 'also that the technology itself might have the power to undermine them' (ibid: 66). This fear of 'mak[ing] a mess of things' was also evident from Comber et al's (1993) female respondents. Neither Robert nor Liam express any such concerns and stated they were confident about their abilities to manipulate and control the computer attributing this to either natural ability at being 'good at computing' or playing down that there might be anything difficult about using computers, as Liam's comment underlines. This aspect of both being *in* control and being able *to* control the technology is an important element in the boys' constructions of themselves as confident ICT users.

In her discussion of women mix engineers in the popular music industry, Sandstrom (2000) states that the manipulation of sound involves issues of power and control on a material level because these issues are inherent in dictating who has access to the technology. She notes that men often dominate the production of music and control the field of sound and recording. Therefore, when women do enter this male domain the gender of the person who mixes the sound becomes an issue of control, as it is not normally women who are in control of these technologies (or the male performers whose music they mix). Bayton (1998) makes a similar point about the role of the live sound engineer who is involved in creating the 'on-stage' mix and 'main mix' for live bands. This is an extremely important role as the sound engineer influences what the audience hears and also has enormous power as the band, when playing, cannot hear what the engineer is doing. When men are in control of the sound, this can have significant consequences for female performers. Bayton notes that club PAs are usually set up with a graphic equalizer mixed for a male voice so the higher frequencies of the female voice are lost and women are made to sound less good on stage.

Consequently, as males continue to dominate technological domains, through the coupling of technology with masculine notions of expertise, rationality and mental logic it becomes apparent that this production of a masculine discourse of technology in the music classroom helps boys position themselves positively in relation to technology whilst preventing girls from achieving a similar level of affirmation. Caputo (1994: 88) believes this connection between technology and 'malestream', rational, androcentric ways of knowing reinforces the intention of computer technology as a tool for allowing student musicians to 'gain control' of the sound through manipulation; music technology shifts attention away from creativity now emphasizing the notion of 'control'.

3.3.3 Sharing Technological Knowledge and Power

Sharing technological knowledge is an important element in men's production of

a technological masculinity, not only having control of the technology but also to be the arbiters of technological knowledge and the power to decide with whom to share that knowledge. Often within technological settings, females are perceived as being the beneficiaries of male technological know-how rather than the dispensers. Within my study, this situation was palpable from the students' comments:

EDWARD: Out of the girls, there's three doing music. A couple of times they've not known how to do something so I've shown them if Sir isn't around.

(A Level boy, Old Tech Grammar)

**

VA: So do you ask Edward for help?
NINA: Um, not really. I go to the teachers.
VA: Right. You don't ask anyone else in your class?
NINA: Well, I usually ask Chloe because she's quite good at it and she's more approachable than Edward.

(A Level girl, Old Tech Grammar)

***

GEMMA: And also there are a few people in our class who are better, who are really good but they'll be like 'No, I'm not helping you, I've done mine'. Ya know, they're a bit [trails off]
VA: Who would that be?
GEMMA: [lowers her voice] Robert, right. He's the main one. He's got the knowledge but he won't share it.

(GCSE girl, Old Tech Grammar)

It appears that the girls did not feel comfortable asking boys for help and, if they did, the boys refused to help them; an observation made by other researchers (Facer et al, 2003). Bayton's (1998) study of women pop musicians indicates that this scenario is quite common within the masculinist culture of the recording studio. Technical knowledge and 'techno-jargon' used by the predominantly male studio technicians is not shared with women technicians as Roberta's comments illustrate:

> **'ROBERTA':** Sound technology is controlled by men and a lot of men want to keep it to themselves. They don't take you seriously as a woman. Some men are fine but the situation is generally that you are liable, as a woman, to be given wrong information, misleading information. They're so possessive about it. Or, they just won't let you near it.
>
> (cited in Bayton, 1998: 7).

This mirrors the situation observed by Feldberg and Glenn (1983) in a customer service department for a US utility company. Initially, men had dominated this type of work; they had originally been service engineers who had worked their way up the ranks. As computer technology became central to customer services, the organization of labour saw a shift from a predominantly male to a predominantly female workforce. Even though male and female clerks were doing the same job, men's greater knowledge of the physical environment was used to imbue their work with higher status. This 'special knowledge', reinforced by cultural assumptions that males are more authoritative, contributed to men becoming 'informal consultants' to the women with the men viewing themselves as experts who 'help the girls out' despite the fact that the work was the same for both. Through emphasizing not only the appearance of having technical know-how but exercising *power* over whom to share it with these men, and the boys within this study, are constructing a masculine identity that is bound up in traditional concepts of what it means to be male. The cultural stereotype of science and IT, for example, as tough and rational offers masculinity 'something' particularly important (Harding, 1986) where definitions of skill and technological know-how maintain notions about men and masculinity. Therefore, feminists argue, the definition of skill is used as a political concept that perpetuates power relations between men and women. The girls' experiences of having the boys' supposedly greater ICT knowledge and skill withheld from them shows how these power relations are also played out within the classroom between male and female pupils.

When played out between teachers and students, these power relations can have a devastating effect. At Old Tech Grammar in particular, there was an expectation that, as high academic achievers, students were capable of working things out for themselves – both technologically and musically. The male teacher at Old Tech Grammar would often refer to the students in his GCSE class as all 'A stars' and made a point of omitting questions in a revision class on African Drumming as 'too easy for you' stating that he wanted to give them nothing less than 'A standard questions at this level'. However, as Gemma's comments indicate, not all pupils were equipped with the requisite technological or musical knowledge:

GEMMA: Miss Prime, we have her on Thursdays and she's really helpful 'cos she will actually explain to us how to do things with computers but Mr Clarke just kind of presumes we're all A star standard. I don't want to bitch about a teacher but he's really musical and he seems to think that everyone else can just do it like that…Mmm, it's like [female pupil] can't read music; I think she's beginning to now but at the beginning of Year 10 she definitely couldn't and she explained to Mr Clarke and he said 'That's just ridiculous'. He never actually said 'Oh, I'll teach you how to read it'. He just told her she was basically stupid. We're still helping her in class. Like if he says 'Use this scale', she's like 'what's the scale of G major?' So she's never actually been taught it.

VA: So he makes assumptions about where you should all be when you come into Year 10. I suppose because a lot of you play…

GEMMA: Yeah, but we're all different standards so, I mean you've got some people who are like Grade 8 on three different instruments and some of us are more, y'know.

(GCSE girl, Old Tech Grammar)

This rather disturbing excerpt is a potent example of a teacher's abuse of his greater power in relation to this female student. This produced a situation in which the GCSE girls rarely asked the teacher for help, preferring to draw upon their friendship networks for advice in the music suite. I would suggest that the teacher's attitude was a major contributory factor to the macho technological culture that was evident at Old Tech Grammar as Gemma's earlier comment

about Robert's refusal to share his knowledge also illustrates. In their work on masculinities, Haywood and Mac an Ghaill (2003) suggest teacher identities provide an important context for the formation of masculine subjectivities and they have a central role in dictating curriculum choices and producing hierarchically organized knowledges which represent an institutionalized gendered regime. The teacher's failure to take the female student's comments seriously and his subsequent withholding of the 'technical' information of music theory is a powerful example of how important the role of the teacher remains both in the symbolic and material construction of the classroom culture.

3.4 Conclusion

This chapter has attempted to provide a cultural context in which students compose. Having highlighted gendered differences in boys' and girls' approaches to learning about computers and music software I demonstrated how differences in levels of confidence between boys and girls could be seen as products of an overtly technocratic discourse that was produced and dominated by the males in the classroom. I have not suggested that girls cannot use technology but I have suggested they often express lower levels of confidence and greater anxiety about what it means to 'control' it. This is in direct contrast to the boys' appearance of greater self-assurance with learning and talking about technology and I showed how they were more likely to position themselves as the main arbiters and controllers of technological knowledge.

In the previous chapter, I noted that girls expressed lower levels of confidence in their use of music technology which indicate that, despite the rhetoric of 'widening access' supporting the push for greater levels of ICT in schools, the availability of computers alone is not the only issue in promoting educational equity. As feminist technology initiatives unfortunately indicate, merely arguing for the widening of women's access to computers falls some way short of addressing more deep-seated reasons for many women's absence from and

ambivalence towards computer technology. Greater numbers of women in technology-based occupations do not automatically lead to a change in either the culture or the structures of an organisation. Even where women achieve powerful positions in which they may materially effect change, they seldom do. In her discussion of female scientists Harding (1991) argues that they are often 'complicitous with male domination' in that they do not tackle such issues as the domination of other women from different classes and races and, ultimately, the structures that produce hierarchical relations remain intact

A strong theme throughout this chapter has been to show how male teachers and male students appear to have more power to actively produce gendered technological cultures which positions female students in a marginalized role that stands outside of the male produced culture. As I discussed, there was a palpable difference in levels of confidence at Crossways Independent and Arts College where far higher numbers of girls overall expressed that they were confident about using music technology. The teachers at these two schools were more circumspect about *their* technological abilities and they would often elicit advice from the students about technological problems – a situation I never witnessed at Old Tech Grammar or New Tech Comprehensive. The overtly gendered discourse of technology produced by the teachers at Old Tech Grammar and New Tech Comprehensive left many girls stating they felt unconfident about their technological abilities and there appeared to be little room for resistance or renegotiation in these classrooms.

CHAPTER 4: GENDERING TECHNOLOGICAL EXPERTISE

4.1 Introduction

Having highlighted the ways male teachers and pupils dominate technological talk and control technological knowledge, this chapter specifically addresses teachers' and pupils' perceptions of expertise in the classroom as it relates to the construction of the 'technological expert' and the gendering of music software. As I outlined in the previous chapter, the alignment of men and masculinity with technology is associated with notions of control, power and skill. These symbolic connections are also played out in the way music software packages become associated with masculinity and femininity – the more 'expertise' required to manipulate the software, the more status is conferred upon those who use it. When a particular piece of software is perceived as complex and difficult boys are more likely to want to engage with it and it is more likely to be viewed as a 'masculine' technology. On the other hand, when a program is regarded as simple and easy to use, the meanings ascribed to it are significantly altered because it does not offer any symbolic affirmation of masculine identity; its simplicity situates it as a 'feminine' technology. I will begin by outlining how notions about expertise and masculinity are produced in order to situate my argument as it relates to the music classroom.

4.2 Expertise, Skill and Masculinity

Within the workplace, masculinity and work are defined by engaging with skilled labour and using machines that require 'special knowledge'. Many new machines simplify and more narrowly circumscribe the nature of the occupations into which they are introduced, which may in turn lead to the de-skilling and degradation of the work that men do. When these new technologies are introduced, the (male) users of these technologies do not automatically reject them but engage in a process of redefinition to claw back any vestige of status and

value they can in order to maintain their (often purely symbolic) control over their labour.

This suggests that men derive different meanings from their work and, in some cases, may even feel affronted when they have to do 'women's work' as this is seen as degrading and reduced in status (Game and Pringle, 1984). One of the ways masculine identity becomes constructed is through using powerful technologies and machines; thus, 'feminine' domestic technologies are not affirmatory of this form of masculine identity and men readily relinquish control of these types of technologies:

> ...in contemporary Western society, the hegemonic form of masculinity is still associated with technical prowess and power. Feminine identity...has involved being ill-suited to technological pursuits.
>
> (Wajcman, 2004: 112)

The technological artefact in the domestic setting has little value attached to it – as a benchmark of masculinity there is little kudos or power attached to using a washing machine!

Murray (1993) asserts that masculinity is defined by its monopoly control of reason, logic, objectivity and the rational mind which technology reinforces. Green makes a similar observation with regard to musical composition whereby the type of knowledge and skills required to compose 'implies a masculine delineation of mind... the more that technology is involved, the more masculine the delineation is, and conversely, the less that technology is involved, the less masculine the delineation is' (1997: 93). Having control of compositional technique and 'technical know-how' further contributes to these delineations. Male composers are the doers and creators of large-scale works, works that require significant technical knowledge of instrumentation and compositional technique. Women, on the other hand, are associated with small-scale forms

(such as songs and works for solo instruments) intended for relatively private, domestic performance outlets and these are considered not to require such extensive technical knowledge:

> The more vocal, the less technologically informed the compositional process is; and the more instrumental, orchestral or electronic, the more technologically informed it is.
>
> (Green, 1997: 84)

Consequently, the more technology is involved, the more masculine the delineation, thus large-scale forms are potentially prohibitive to women. Conversely, less technologically demanding smaller-scale musical forms are unlikely to conflict with patriarchal constructions of femininity and are acceptable compositional forms for women composers. Both technical and technological expertise are thereby associated with the cerebral and become 'bench-marks' of male identity.

This association of males with technological expertise extends into a range of musical arenas. Bayton (1998) found that women entering the record industry often find themselves in low-paid, unskilled or semi-skilled jobs that carry very little status or power. The most prestigious jobs were occupied by men. Cunningham (1998) argues that the use of digital technology within club culture offers a creative environment in which anyone, male or female, can participate and, although she does acknowledge the gendered culture in which this is carried out, she rather downplays this. She notes that one of the most important aspects to club culture is the DJ's adoption of the mixer whereby the DJ is no longer a passive 'record player' but becomes a virtual musician through their use of mixing and sampling. These provide technical skills that have encouraged 'the rise of the DJ as technical innovator and (later on) as fully fledged producer' (Harley, 1993: 222, cited by Cunningham, 1998: 132). This transition can be witnessed in the work of high-profile DJ-Producers such as Fat Boy Slim and

Paul Oakenfold. Although Cunningham notes that women DJs are becoming more common, far fewer go on to become record producers, achieving this greater level of technological status. This suggests that the material and symbolic distinctions between male and female expertise remain intact and institutional factors continue to favour males over females in pop and dance cultures:

> The democratising function of the new technologies of pop seem to stop short of opening up the new forms of composition and engineering for women – probably for socially complex reasons having to do with the identification of technology with masculinity. In other words, it is the boys, still, who are playing with the toys.
>
> (Goodwin, 1992: 92, cited by Cunningham, 1998: 145)

The construction of male technological expertise can therefore be said to emanate from this hierarchical gender relationship that sees masculinity and femininity as oppositional and in which the connection between technology and masculinity affords men greater control and power in circumscribing 'who counts' and 'what counts' in technological spaces. This reinforces the conviction that masculinity is allied to notions of technical competence, whereas women's apparent 'lack' of technical competence becomes part of a type of feminine gender identity that is expected of women (Wacjman, 1991). As McNeil (1987) points out, arguing for a 'feminist technology' that resists male expertise is not possible because women are inescapably part of the cultural setting. Turkle and Papert (1990) believe that the new computer culture is not just about creating new environments but a new social construction of the computer. By this they mean forging new ways of thinking about what computing 'means' in order to encompass and embrace all subjective experiences and meanings. In a technological environment, who is supposed to be good at using technology or take part in it is often determined by cultural assumptions about what technology 'means' (Grint and Gill, 1995). The definition of skill can be used as a political concept that perpetuates power relations between men and women.

Cockburn's (1983) influential study of the changes in the hand compositor's occupation mirrors this focus on skill and power relations. The hand compositor in the printing industry was a highly regarded skilled profession that required physical strength, good literacy skills and manual dexterity. Women were excluded from this occupation on the ideological that hey were equipped neither physically nor mentally to undertake such work. There had been a number of technical innovations in the printing industry but the development of electronic composing technology in the 1960s saw the biggest change in typesetting. Inputting was now performed via a QWERTY keyboard requiring little more than good typing ability. However, by this time, typing had become associated with women contributing to the perception that the hand compositor's occupation was now less highly skilled and, perhaps more significantly, had become 'feminised'. An ideological distinction had to be made between the *skilled* compositor sitting at a keyboard as opposed to the *unskilled* female typist sitting at a desk, in order to maintain the distinction between male and female occupations and what constituted 'skill', although essentially they were carrying out the same type of work. Cockburn (1985) argues that this purposeful differentiation of what constitutes skilled and unskilled work plays an important part in the construction of gender.

The above has considered how skill and expertise become symbolically associated with masculinity, and underpins the following discussion which examines how meanings around technological expertise are constructed via gendered division of labour, pupil and teacher perceptions about what constitutes the technological expert and the nature of the discourse that surrounds this construction.

4.2.1 The Teacher as 'Expert'

There is a notable absence of references to the teacher within government ICT policy documents other than as a person who must implement and integrate new ICTs into the classroom to improve teaching and learning. The teacher him/herself is not conceptualized as a person who also has to negotiate the gendered space of the digital classroom. In their work on teachers' working identities and new technology, Jenson and Brushwood (2003) noted that very few women in their case study schools held technical computing or even support positions; the IT specialist was usually a male member of staff. Most of the computer labs were taught in and 'overseen' by a male teacher. Even when he [sic] was not teaching in the computer lab, there remained an assumption amongst the other teachers that he was the primary user and also the 'technical person'. They found this assumption common in many teachers' perceptions of the male technological expert. Drawing on the experiences of one of their female teachers, a computer literate and highly skilled member of a three-person technology team, they found that this female teacher was largely relegated to 'support' roles both by her team members and other staff members – a position she found very difficult to counteract even though she was equally well-qualified in ICT and had comparable experience to her two male colleagues. Jenson and Brushwood found that in conversations with other teachers in the school, when problems arose, they would generally go for advice from the two male co-workers who they were happy to label as 'experts'. The female team member was never named as a 'technology expert' by her colleagues, a position that was quite contrary to her level of knowledge and expertise.

As my earlier discussion illustrated, there was an overriding technological discourse within both New Tech Comprehensive and Old Tech Grammar and it is perhaps unsurprising to note that the male teachers in both these schools are constructed as the main arbiters of technological knowledge. The Head of Music at New Tech Comprehensive seemed very capable at resolving technical problems

and worked on an 'ad hoc' basis with the pupils as and when they called upon his assistance (which was often). During his interview I asked if all members of staff were familiar with using music technology. He said that he and another (male) member of staff were familiar with it but the other (female) member of staff was not. In an informal conversation with the female member of staff I discovered that she had not received any training with music technology. Having been out of classroom teaching for thirteen years she felt that she was 'learning from the students... they know far more than me. I just let them get on with it'[20]. From the observations as well, the male teachers are the main source of technological information and the main 'troubleshooters'.

This notion of the male teacher as expert is also strong at Old Tech Grammar. There were two male teachers and one female teacher in the music department, all of whom taught GCSE and A Level; two of the A level lessons I observed were taken by Miss Prime. In my interview with her she told me this was her second post since qualifying and that although she was still quite new to computers she felt confident about using them and said that she had no real concerns about technology. The Head of Department, Mr Clarke was, by his own account, the technical expert. When asked who sorted out problems in the technology suite he replied 'Me, always me'. The third teacher, Mr Smith, had a very confident manner in the music suite although I never actually saw him teaching (and so was not formally interviewed). This *appearance* of confidence around technology, however, belied some observable limitations in his actual knowledge but the way he dealt with this during an encounter with Miss Prime illustrates the ways in which he took an active role in constructing himself as an expert, not just through his mode of social interaction but through his physical control of the hardware and the surrounding space. This occurred while Miss Prime was teaching an A level class in the music suite. Mr Smith came into the room and began talking about the need to set passwords on the computers so that the screensaver could

[20] Since carrying out the study, this female member of staff left the school after only one academic year. She has not sought other classroom music teaching posts but returned to her post as a peripatetic woodwind teacher.

not be changed as the pupils had been 'messing about' with them. He sat in front of the computer with his hand on the mouse; Miss Prime stopped teaching and sat beside him. She told him that she did not know how to set a password; Mr Smith said neither did he but he would try to sort it out. Mr Smith spent about seven minutes playing around with various possibilities and eventually found out how to set the password so that the screensaver could not be changed. Throughout this time, Miss Prime remained seated to his left and had no physical control over the computer.

During this exchange, as I observed, Miss Prime was not given the opportunity to try to rectify the screensaver problem. Although neither teacher knew how to solve the problem, the male teacher, by physically controlling the space around the computer, gave the *appearance* of knowing what he was doing and positioning himself as technologically expert. During the interviews I asked the pupils, some of whom had been in the class at the time of the above encounter, if they thought there was any difference between their teachers in terms of their ability to use music technology. From the pupils' comments, Miss Prime was perceived as being the least technologically skilled and I would suggest that the type of encounter I have just described contributed to this perception. The students tended to position the male teachers as experts of technology but the female teacher was positioned as no more than a passive onlooker:

EDWARD: Um, well, Miss Prime doesn't really do a lot of technology. It's mainly Mr Clarke 'cos he's very up in that and Mr Smith, but him not so much 'cos he hasn't been here that long. But Miss Prime, like she sits in while we do compositions and that but no, she's not as technological. She's not as good at technology as Mr Clarke.

(A Level boy, Old Tech Grammar)

**

STEVEN: I'd say that because Mr Clarke has been in the department longest [regarding expertise] but the other two are learning fast.

When Mr Smith came into the school he didn't have a clue but now he can help you out with things.

VA: And Miss Prime?

STEVEN: I've never had her much for technology but she does come in during the mornings and print stuff off for orchestra.

(GCSE Boy, Old Tech Grammar)

Edward described the female teacher's role in the music suite as 'sitting in while we do compositions' asserting that 'she's not technological'. Steven acknowledged that she did engage with technology but this is only to 'print stuff off for orchestra'. Although he states that both Miss Prime and Mr Smith are 'learning fast' about technology, only Mr Smith is mentioned as being able to offer technological help. It was interesting to note during both observations of her teaching that Miss Prime was rather more active than Edward's comments suggest and within the course of the lesson she engaged with every student in the room, listening to their work on the computer and making suggestions about how it could be improved. However, unlike the types of technological interactions I witnessed between the male teachers and pupils, Miss Prime was not called upon by her A Level group to engage in any technological talk:

2nd Observation of AS Music Group, Old Tech Grammar. 24th March 2003: Music Suite

Miss Prime then goes over to Edward and asks him what he's working on. It's a theme and variations. She asks if she can listen to it. He says he'd rather she didn't and would rather she listen to it at the end of the lesson.

She then goes over to Alistair who is arranging. She listens to Alistair tell her about his piece. He says 'there are better ones on his computer at home' [meaning sounds] as he is not happy with the sound quality. His piece is scored for Sax, Trumpet, Drum, Piano and Bass. She uses headphones to listen to his piece[21]. She says 'good' and talks about the rhythm employed by the piano. She asks him to compare the beginning and the end of the piece: 'I feel here it's better to break them up; it's an upbeat piece therefore it keeps it moving. It feels something more interesting needs to be done with the chords'. She makes a number of musical comments but is not asked any technical questions connected with the software.

[21] At the end of the lesson, I listened through to Alistair's composition. It would not have been appropriate to ask to listen to it during the lesson as he was working with the teacher.

Although Miss Prime teaches composition in the music technology suite where all the students compose, there is a perception of her as the person who teaches the technical language of composition rather than *technological* language of computers:

> **EDWARD:** I think her forte is like Serialism. modern stuff. We've been doing that with her so we've been doing about Minimalism, Serialism. things like that; reading the rows, stuff like that.
> *(A Level Boy, Old Tech Grammar)*

This comment was made the day after the second observation, cited above. Although this female teacher stated that she did not feel unconfident about working with music technology, the perception of her technological abilities are compared unfavourably to the male teachers in the department who participate in a more overt and sustained form of technological discourse as previously discussed. Green (1997:186) argues that women teachers can experience what she calls a 'refutation of their own femininity' when they display competence in an area that is not delineated as feminine and this may help to account why I never observed this female teacher challenge the way she was positioned by the male teachers and pupils as a technological subordinate. Male teachers and pupils would engage in technological talk – asking about software, how to carry out certain technologically-oriented tasks – but girls were neither encouraged to participate nor showed any signs of wishing to contribute to these technological interactions.

Consequently, the combination of teachers' behaviours, structural factors (such as not giving the female member of staff at New Tech Comprehensive suitable training), pupils' perceptions and type of discourse invoked by teachers serve to construct female teachers as less technologically able than their male counterparts. Within the workplace, even though carrying out the same tasks, men's 'greater knowledge' of the technology creates the perception that this

knowledge imbues them with higher status because of the skills they are deemed to possess. As we saw in the scenario between Miss Prime and Mr Smith, this 'special knowledge' reinforces cultural assumptions about male authority and skill that produces gendered notions about expertise.

4.2.2 The Pupil as 'Expert'

Early studies of gender and education have often argued that gender differentiation within the classroom comes about because of the ways in which teachers treat boys and girls: they may hold differential expectations of their educational abilities in certain subjects (such as maths and science), allow boys to dominate their attention and control classroom conversation and may not accord girls' work the same value as that of boys, who are often seen as having more 'imagination' and 'creativity' (Clarricoates, 1978; Spender, 1982; Acker 1994). However, in her seminal work on gender and music education, Green examines the ways in which pupils are also actively involved in these subject positionings, arguing that teachers and pupils 'collude with each other in the perpetuation of the gender politics of music: the construction of a gendered discourse on music that aids in the regulation of gender…' (1997:186). She goes on to say:

> The delineation of femininity or masculinity enters the experience of pupils and teachers; and according to where each individual positions himself or herself with relation to the music, the delineation gives confidence, or takes confidence away; affirms identity, or interrupts and problematises it.
>
> (Green, 1997: 186)

For 'music', we can also read 'technology'. This can help illuminate how the pupil 'expert' is brought into being through a discursive framework produced by teachers and pupils and the way individuals position themselves in relation to the meanings constructed around technological expertise. Throughout my

observations, teachers played a significant part in producing the male expert; in none of the four schools did I observe a teacher calling on a female student for advice about the technology, but this was often the case with regard to male students, and serves to enable boys to take up an active positioning of themselves as 'experts'.

On the questionnaire, I specifically asked students to 'nominate' a technological expert from their class and it was significant that all the boys except one (Nick, a GCSE student at Arts College) nominated another boy. This information was further explored during the interviews but it also enabled me to be sensitive to who was being constructed as the expert and to what extent this was accepted or rejected within the classroom. An interesting example of this was observed during the GCSE lessons at Arts College in relation to two students, Nick and Lisa. During their interviews, when asked to whom they turned for advice on technological matters when things went wrong they both said the teacher, but they both also nominated a female student (Jane) who 'knew quite a lot about it'. In addition Nick mentioned another boy, Gary whom he considered 'quite good at technology'. I went through my field notes again to see if Jane appeared as an 'expert' during the teacher/pupil or pupil/pupil exchanges in the previous two lessons but could not find any instances of this. Consequently, during the third observation I was more sensitive as to who was being called upon to provide technological 'expertise'.

The class project, carried out in the Music Technology suite, was about the Viennese Waltz. Using Strauss's 'Emperor Waltz', the class discussed its musical elements and then moved on to composing their own Waltz using the 'Emperor Waltz' chord sequence as the framework for their own version. Upon going to their workstations, the teacher told them to program in a 'backing rhythm' to help them maintain the feel of the Waltz. Gary called out that the rhythm track went on track 17. The teacher said she had not realised this and pointed this out to the rest of the class. Lisa had been working quietly on her Waltz, recording the

chords and playing a melody line over the top, when she encountered a problem with the computer. Despite the fact that Jane (Lisa's nominated 'expert') was sitting immediately to her left, she went over to Gary to ask him to help her, which he duly did. Two other students subsequently asked for his help (how to set up the metronome click and another question that I did not catch). The teacher called upon Gary again on two further occasions when things went wrong during the lesson, although on one occasion he was unable to help. He appeared happy to adopt the role afforded him, only complaining that it 'gets in the way' of his own work; he did not challenge his position and seemed to enjoy the high status position it placed him in. Jane did not participate in any of these exchanges and there were no observable moments within the lesson where Jane either requested technological help or was asked to provide it.

Pupils can, of course, attempt to resist or subvert these powerful discourses but this is not always possible; individuals' own 'interpretive frameworks' (Grint and Gill, 1995) are circumscribed by the hierarchies of power constructed through social relations. In the case of Arts College, the pupils' apparent freedom to nominate whom they perceive as the technological expert conflicted with the teacher's authority (and the other pupils' subsequent acceptance of this authority) in the construction of what constituted the 'expert' and this superseded the individual's personal construction. Gary's knowledge appeared to be more highly valued than that of other students who seemed equally competent with the technology, including Jane. The teacher's use of language (apologising to Gary on one occasion for supplying information to the class that she is aware that he 'knows inside out and upside down') and her constant privileging of his technological ability over both hers and the other students puts Gary in the position of the 'expert'. The teacher's advocacy of Gary's abilities above the others reproduced a technological environment that reinforces male expertise. The pupils, even when in the position to do so (as when Lisa turned to Gary for help rather than her neighbour Jane, her nominated expert) adhere to the teacher's greater authority and acquiesced in supporting this boy's privileged position.

Oddly, this also produced an ambiguous culture in which the teacher's authoritative voice was undermined. Although Nick and Lisa said that they would go to the teacher first for help, I found no evidence of this during the classroom observations.

This construction of the male computer 'expert' was also observed by Facer et al (2003). By the age of 12, 'David' was the acknowledged ICT expert at home and he soon found himself in a similar position at school with teachers and pupils calling on him for advice. He was also able to put all the back editions of the school magazine into hypertext mark-up language (HTML) and this expert knowledge was rewarded with special privileges such as access to the Internet not afforded his classmates. Like Gary in my study, children like 'David' were happy to develop this technological identity which 'came from their appropriation of the symbolic power of the computer itself' allowing 'David' to move between the world of childhood and adults (ibid:116).

It is important to recognize that this adult affirmation of their technological abilities plays a significant role in enabling Gary (and 'David') to *actively* participate in the construction of a type of masculine identity associated with technological skill; it is dialogically constructed between him and the teacher/pupils. Similar situations have been noted in other research about school computing classes and, although the girls did not openly express dissatisfaction in the classroom, they did so during their interviews and appeared angry at being marginalized in this way (Singh 1993, in Stepulevage, 2001) but felt unable to articulate this in the classroom. It is therefore not a case of simply examining the role education plays in reproducing dominant codes and identities, but also of acknowledging that individuals are involved in the active construction of their own complex identity positions (Dillabough, 2001). Although it is generally held that gender behaviour and relations are a process of accommodation and mutual acceptance (Reay, 2001), these constructions are often difficult to achieve and maintain when a particular set of social relations is being produced. Individuals'

interpretive frameworks are embedded within a set of social relations that imbue their experiences with meanings. The gendered social relations constructed around technology do involve strategies and counter-strategies of power, and these *active* positionings may allow new meanings and discourses to emerge. The example cited above supports my assertion that even where subjects seem able to construct their own meanings, these can be subsumed within the prevailing culture that may not be in accordance with these individual constructions.

This does not mean that the dominant discourse of a technological masculinity cannot be subverted, but it is often difficult for those who are positioned outside of that discourse. However, I did observe one instance of girls attempting to construct their own 'expert' that ran counter to the dominant discourse within the classroom. At Old Tech Grammar, in my first GCSE observation I had noticed a group of three girls in discussion. Although each was working at their computer on their own compositions, one of the girls, Vanessa, was helping the other two, one of whom was having difficulty notating her Blues piece. This went on for some time and Vanessa eventually went back to her computer although she did not seem to be working. I went to talk with her and found out that she had completed her piece (which I listened to), I chatted informally about how she had composed the piece. She was a very confident technology user, having the relevant software at home, but stated that she did not like composing and preferred playing (she had grade 8 in two instruments). Later, when collating information from the questionnaires, I noticed that she had been nominated as the technological expert by two of the girls in her class, and decided to explore this further during the interviews. Unlike the boys' reasons for nominating their expert, the girls emphasized different qualities that did not really relate to technology, such as the ability to impart knowledge, sensitivity and patience. The girls associated certain qualities with their technological expert that stood outside of the prevailing ideology of the expert put forward by the teacher:

VA: Right. So you've nominated Vanessa as your 'expert'. Is she the person you go to most of all?

GEMMA: Yeah, because she'll, she's really patient with us. She'll explain things and also she's really helpful. She'll listen to what you've done, say 'that sounds good but perhaps you could put it in a different key to make it sound better' and things like that. And also there are a few people in our class who are better, who are really good but they'll be like 'no, I'm not helping you, I've done mine'. You know, they're a bit... [trails off]

VA: Who would that be?

GEMMA: Robert ... right. He's the main one. He's got knowledge but he won't share it.

(GCSE Girl, Old Tech Grammar)

These sentiments were echoed by Joanne who had also nominated Vanessa:

VA: When you come across various problems who do you normally ask for help when you're here?

JOANNE: When I'm here there's a girl in my class, Vanessa.

VA: Yeah, you put her as your technological expert. The one who's really good...

JOANNE: She's been really nice, yeah. And sometimes, it's like the teachers are dotted about and you can't find them straight away and she's always there to help. Um, if I need a second opinion or something then I know she's going to be truthful and help me out. If it's rubbish she'll tell me.

(GCSE Girl, Old Tech Grammar)

Looking at these comments, even though I framed the question within the context of nominating a 'technological expert', the girls' reasons for nominating Vanessa do not specifically refer to anything technological but focus on her musical and personal qualities - her ability to listen and give good critical advice. She is described as 'nice', 'patient' and 'helpful', qualities that her female classmates value when asking for advice and help.

Gemma also nominated Robert but her reasons were completely different for those she gave regarding Vanessa, even though both had been nominated for their apparent technological expertise:

> **GEMMA:** He was taught by someone, I think it was Mr X [now left]. and he was taught the sequencers or spent a lesson with Robert and taught him how to do it because he doesn't play an instrument and he spent hours doing one of his compositions [...] He sequenced it and it was *so* good! He said, his mum timed it over a period of three or four days; he spent pretty much four days solidly working on it.
>
> *(GCSE girl, Old Tech Grammar)*

Robert's ability to work 'for hours...four days solidly' on his piece was given as a reason to nominate him as an expert and echoes the observations made by Hapnes and Sorensen (1995) about how computer hackers construct masculinity. They noted that hackers took great pride in being able to work for extremely long hours without stopping. MIT Hackers call this 'sport death' where the mind and body are pushed beyond their limits by denying themselves food or sleep (Turkle, 1988). Hackers have been described as 'compulsory programmers' whose very existence is bound up with computers and expert knowledge; computer geniuses whose brilliance has enabled them to penetrate the world's computer systems:

> Bright young men of dishevelled appearance, often with sunken glowing eyes, can be seen seated at computer consoles, their arms tensed and waiting to fire, their fingers already poised to strike at the buttons and keys... Their rumpled clothes, their unwashed and unshaven faces, and their uncombed hair all testify that they are oblivious to their bodies and to the world around them. They exist, at least when so engaged, only through and for computers.
>
> (Weizenbaum, 1976:116 cited in Nissen, 1998:149).

I would suggest that Gemma's perception of Robert's expertise was, in part, connected to this rather macho image of the male computer expert.

The skill and status associated with boys' engagement with technology reinforce the symbolic association of masculinity with technology and must be maintained at all times, often at the expense of female students and teachers whose

knowledge is not accorded the same value. Men's engagement with technology must continue the illusion that their 'expertise' is highly valuable and the skills need to engage with technology must be redefined to maintain gender relations that denigrate women's knowledge and skill. These symbolic associations also manifest themselves in the way school curriculum subjects are stereo-typed as appropriately male or female.

4.2.3 Expertise and the Gendering of School Subjects

Comber et al (1993: 124) have noted that music is traditionally regarded as a feminine domain. Far greater numbers of girls sit the GCSE exam compared to boys and they are more likely to play musical instruments, possess traditional music skills, participate in choirs and attend concerts. Boys also avoid musical activities in the classroom that are perceived as 'cissy' or 'un-macho' (Green, 1997). In contrast, as ICT and computers are perceived as a masculine domain, boys' claims on certain types of software as 'masculine' may lessen the music classroom's feminine connotations by producing an affirmatory masculinity aligned with complex technologies and high level skills. Although O'Donnell and Sharpe (2000) report that the adolescents they interviewed in their study on adolescent masculinities thought that jobs in the computing industry are appropriate for both males and females, they note that actual computing skills are still seen as a male preserve and these skills are often associated with the ability to be 'good' at maths or science which boys are supposedly better at.

This notion is reinforced by the perception that more complicated forms of computer technology are associated with mathematics, for which boys are better equipped than girls, having greater aptitude and being the 'right type of thinkers'. The strong ideological link between mathematics and other branches of knowledge such as science, engineering and computing - as traditionally associated with men and masculinity - attempt to exclude women on the grounds that they lack the ability to engage in rational abstract thought. Cognitive

psychology has attempted to 'prove' that these differences are indeed 'real' rather than socially constructed; 'finding' differences between men's and women's cognitive abilities has led psychologists to argue that women are poorer at those spatial tasks perceived as important in mathematics performance and engineering occupations thus providing more 'proof' for women's exclusion from the areas of maths and science. Griffith (1985) points out that these arguments are both weak and inaccurate. Until adolescence, girls are equally good as boys at performing spatial and mathematical tasks but, when adolescence begins, these start to deteriorate. Masculine and feminine behaviours appear to be more pronounced as children get older and adolescents appear to conform more overtly to cultural assumptions about appropriate types of 'feminine' and 'masculine' behaviours. This suggests that the factors linked to this 'drop off' in performance are more likely to reflect these 'normalizing' notions of gender than actual differences in ability.

In national assessments for seven year olds (1995, cited in Arnot et al, 1999) girls actually performed better than boys in mathematics (81% of girls and 77% of boys reached the expected levels) and in science (86% of girls compared to 83% of boys). By Key Stage 2 (age 11) and Key Stage 4 (age 14) these differences have levelled out and there were marginal differences between the sexes. Around Key Stage 4, Murphy (1991) notes that a markedly higher proportion of girls than boys described physics and chemistry as difficult although recent figures indicate that there are few gender differences in subject choice at secondary level which Arnot et al (1999) suggest may be in part due to the introduction of the National Curriculum. This has played a key role in reducing sex segregation in school subjects up to the age of sixteen but has not eliminated it altogether; some gender differences remained in subjects such as physics and craft, design and technology (CDT), home economics and social studies. What was particularly noticeable was the widening of the gender gap in subject choice at post-compulsory level for 16-18 years old which can also be detected in trends for music technology and associated subjects where females represent only a fifth of all music technology

candidates, just over a third of all mathematics candidates and a sixth of all computing candidates (See Fig 3).

Fig 3: Numbers of pupils entered for A Level in Music Technology, Mathematics and Computing[22]

Year	Music Technology	Mathematics	Computing
2005	Males: 2,009 Females: 489	Males: 13,378 Females: 9,230	Males: 408 Females: 68
2004	Males: 1,833 Females: 488	Males: 12,976 Females: 8,446	Males: 496 Females: 76
2003	Males: 1,452 Females: 398	Males: 12,437 Females: 7,836	Males: 591 Females: 105

When students are again able to make their own choices they often revert to sex-typed subjects and courses, especially in the areas of science and technology that Arnot *et al* (ibid) attribute to the continued 'masculinisation' of these subjects. They suggest this has a palpable effect on subject choice and what is considered 'appropriate' for males and female, as the figures above support. Unfortunately, it is this symbolic aspect of school subjects that is generally ignored by Equal Opportunities campaigners.

4.3 The Gendering of Music Software

In this final section, I continue to develop the notion of 'masculine' skill and expertise arguing that it is also integral to the way in which music software takes on masculine and feminine connotations; software programs perceived as requiring greater technological skill carry more status than those that are regarded as 'easy' programs to use. Throughout this thesis, I have argued that expertise is

[22] This was collated using figures obtained from www.edexcel.org.uk

an essential part of masculine identity and have attempted to demonstrate how cultural assumptions about male knowledge are reproduced in the music classroom. As such, the technological artefact is part of a social system, intrinsic to the ways in which certain types of social relations are produced and maintained. While continuing to draw on this argument, I also wish to tease out the idea that the software can have a political dimension.

Hacker (cited in Smith and Turner, 1990) argues that technology does not simply 'emerge' - there are no internal operating principles. Rather, its selection and development are directed by the men [sic] who own and manage it. Instead of simply saying technological artefacts are either 'tool-like, devoid of politics' or that they are 'instruments of oppression' (Faulkner, 2001), we can look at the ways that gender relations are contained and constructed *by* technological artefacts that give a material form to the mutual shaping of gender and technology.

Winner (1999) argues that we must take technical artefacts seriously and not reduce everything to the interplay of social forces. He is interested in examining the characteristics of technological objects and the *meanings* of these characteristics and, from this perspective, he argues that technologies can be said to contain *political properties* that come to represent forms of power and authority. Bromley (1997) asserts that technologies are not infinitely malleable and cannot be put to absolutely any end at will and thus, to over-emphasize the context of use leads to the problem of assuming that the impact of a technology is wholly determined by the intent of its users. Like Winner, he believes that there is a dialectical relationship between what he calls the 'bias' contained within the technology and the context of use which is transmitted through the social nature of its design and development. If we acknowledge this possibility, we would have to take into account the political aspect of its design which may have been developed with a precise agenda in mind. This may best serve the interests of certain social groups to the detriment of others. In this sense, the political properties Winner (1999) speaks of also have an ideological function. The

artefact's 'design' may have been carried out by groups who have a particular interest, or just make presuppositions related to their own needs, in maintaining certain social relations which may prove difficult to reconfigure, within the possibilities available from the artefact, by other less powerful groups.

4.3.1 'Feminizing' Technology

This argument helps us to understand how the design and complexity of types of music software come to reflect an 'ideal' user whereby the design and utilitarian intention of the artefact may encourage some uses while prohibiting others, shaping the meaning of that artifact. As Yates and Littleton (2001:111) argue, both the content and the context of software can offer a preferred 'reading', which allows the take-up of some subject positions while inhibiting others and women often experience problems when negotiating the male-gendered, preferred readings within very violent or sexist computer games, for example. Computer games played by boys are often very violent and have militaristic and patriarchal associations that do not often appeal to girls (Kiesler et al, 1985; Kirkup, 1992; Sofia, 1998).

Green (1997:101) observes in her discussion of music criticism, that using the label 'feminine' not only expresses ideas about the characteristics of femininity (and masculinity) but is also a value judgment. As such, 'feminine' technologies, like 'feminine' music (when applied to women) are denigrated and positioned as lesser and inferior to that which is considered 'masculine'. Consequently, 'feminine' technologies are considered easier to use and require less skill to operate them. Alemany Gomez (1994) found that wives of washing machine engineers were asked to test out the washing machine's capabilities at home to see how well the design features stood up to use in a real domestic setting. Although, superficially, it appears as if they were being consulted about the machine's design, a particular ideology was being invoked that, in fact, strengthens gendered expectations about women's ability to manipulate technology. The intention

behind enlisting the wives' help was not to find out how to make the machine easier to use generally but more specifically, how to make the machine easier for *women* to use. Within this industry, there is a strict delineation between men and women's roles: the former occupying the technical, decision-making roles, whilst the latter are ordinarily the users. This is further intensified by the 'washing machine culture' invoked by the (male) engineers whereby they imagine the 'errors' that might be made during the washing machine's use. This involves a series of scenarios depicting women's 'clumsiness' and 'technical ignorance' that justifies incorporating devices which, in the technicians' perceptions, would prevent it from malfunctioning however inept its user. A money-saving initiative leading to reduced production time resulted in an innovation that positioned the washing machine drum higher in relation to the door so that the water level would now be higher than the bottom of the door. This new innovation necessitated the installation of a safety catch in case, as the engineers put it, 'the women were absent mindedly to open the door during the washing cycle' or 'a child were to open the machine' – the female user being conflated with the naughty child in the eyes of the engineers. Alemany Gomez sees this as producing gender relations that are, in fact, a set of power relationships. Therefore, this form of man-made technology constructs the female user as technologically incompetent while the designer incorporates certain technological features to save this female user from her own incompetence. Thus, men are able to retain the power both to dictate the design and use of the technology and to discursively produce women as incompetent 'child-like' technology users.

The same ideology is played out in relation to the microwave (Ormrod, 1994). Initially, in order to reduce its feminine connotations the microwave was initially sold as 'brown goods', presenting this new type of cooker as a technologically interesting pie-warmer rather than as an appliance for home cooking. As long as it remained as 'brown goods', it could not be seen as challenging stereotyped notions of masculinity but on being redefined as 'white goods', the difference in meaning was more pronounced. As 'white goods' its meaning changed and it

became associated with 'feminine' technologies such as washing machines and cookers. These technologies are used for routine tasks that women do every day rather than those non-routine tasks that men so often undertake (Faulkner, 2001); as 'feminine' technologies are perceived as requiring fewer skills to operate them, hence men disassociate themselves from them.

Berg (1994) carried out research into 'smart houses'; highly technical structures equipped with a range of hi-tech gadgets 'doing things for you so you don't have to think'. When designers were asked to state the advantages of the 'smart house', they suggested comfort, security and convenience but labour saving was absent: housework was invisible. The designers of the 'Honeywell' smart house, however, asserted that they had made housework a consideration: the automatic light switch meant the housewife entering a room with her arms full of wet clothes would not have to put them down and switch on the light! Women's skills and knowledge about a house were not considered and, despite their obvious conception of women as the main domestic worker, their target consumer was unspecific and vague seeming more interested in what electronic and technological gadgets could be incorporated. The innovation process is deeply gendered and Berg states that this socio-technical construct reflects a male idea of what a home should be and is effectively gendered by what it leaves out. Berg believes that technology can be open to flexible interpretation but she finds no evidence of this within the smart house. This is hardly surprising given what she has described. The woman in the smart house *is* visible in the minds of the designers – she will be doing the laundry.

The mass manufacturing of the typewriter from around the 1870s opened up an area of work that initially was extremely beneficial to women as it was well paid and of comparatively high status due to the required level of literacy needed to undertake such work. However, as Softley (1985) points out, women were encouraged to take up typing jobs, because the female typist could be employed at a lower wage than the male clerk could. This 'feminization' of clerical work was

also reflected in the structuring of the office in that literate males, although also employed as clerks, found it much easier to move up into managerial and professional positions (Davies, 1988). With the burgeoning of automated office systems, from around the late 1970s, high levels of ICT literacy from all office workers was now required, irrespective of gender. However, computing activity has always been strongly gendered in both the organization of work and the continued 'feminization' of the early word processor design, devised as an extension of the typewriter so that it would be familiar and usable by *women* office workers. Hofmann (1999) made similar findings when examining how office computer programs were devised. She suggests that programs embody a 'generalised idea' of the user based on the 'female' secretary. The program was based on simple secretarial tasks and, in the words of the designer, was designed for 'dummy operators'. It was highly circumscribed and the female users were prevented from attempting autonomous tasks such as deleting or renaming. Men have traditionally kept their distance from other highly gendered office technologies such as the photocopier and the filing cabinet, as subordinate workers carry out tasks involving these artefacts.

In contrast, Webster (1993) believes that, as computers are now less like dedicated typewriters and no longer associated with degraded women's work, it has become more acceptable for men to use word processors. However, it has been suggested that some types of computers are more suited to female users than males because the interface is better-suited to women because of its simplicity. Turkle (1995) suggests that the Macintosh interface, with its simulated desktop introduced a way of thinking that put a premium on surface manipulation and working that was ignorant of the underlying mechanisms. This Graphical User Interface (GUI) became popular with the emergence of the Apple Mac[23] in the 1980s making it easier to move data from one application to another. Previously the DOS operating system was the most widely available and this entailed

[23] Information gathered from the web technology encyclopedia www.webopedia.com

interacting with the operating system through a set of commands; GUIs dispensed with this requiring no more than pointing and clicking on an icon with a mouse. Hapnes and Sorensen (1995) also note that Macintosh computers are associated with women because they are well-structured and rule-based, and therefore simpler to use whereas men like to see themselves as having the freedom and ability to operate within a more 'complex' computer environment. This is also a reason males gave for disliking the programming languages PASCAL and COBOL, programs that represented uniformed and rule-regulated systems. Males like to see themselves as being able to experiment with programs on a more free and intuitive basis rather than being forced to interact with it in a rather didactic sense. 'Macs' (Mackintosh computers) are also viewed as particularly useful for the application of graphics programs which are also defined as feminine enabling the user to work with animation, a paint program for drawing and desktop publishing, for example. However, within male hacker culture, a (false) distinction is made to ensure that, although men also work with graphics, this is not defined as an application in the 'feminine' sense because they are designing their own graphics packages.

I would suggest that music composition software is also implicit in this construction of a masculine identity. Men are willing to cede control to women only in circumstances that involve technologies that are perceived as not requiring any particular skill or ability (such as domestic technologies). It appears that, within the music classroom the appropriation of certain types of software as being compatible with high levels of skill is an important aspect of boys' masculine identity. When women take on the work that men do, that work is often viewed as having become de-skilled and degraded. Females, even when engaged with technology, are positioned in such a way that the similar status accorded to males is not conferred. In this way, the design and complexity (or simplicity) of a music software program enters into the construction of gender identity. The different meanings students construct around the software and the software's capabilities

carry different values[24]. Caputo argues that, for female students, 'there are conceptual and value-laden agendas in the software and presentation of music technology that reflect mainstream ways of knowing' (1994:89).

It appears that score-writing notational packages such as Music Time Deluxe and Sibelius are perceived in this way because they are considered to involve very little technological skill. The music can be inputted either via a MIDI keyboard or via the mouse, using the keypad with the mouse to specify rhythm and pitch. The screen interface resembles a piece of manuscript paper:

PETER: I just find Sibelius really simple. It's just easy to put a note down, you know, conventional notation.
(A *Level Boy, Crossways Independent)*

**

CAROLYN: Um, well it depends what you mean by music technology because I don't really think Sibelius is what I really think of as technology because my brother is doing music technology and it's all keyboards, mixing desks and things like that.
(A Level Girl, Crossways Independent)

***

CRAIG: They sometimes use Music Time Deluxe here [at school] but it's a bit rubbish really, so generally, if I was doing sequencing stuff, I'd do that at home using Cubase or Logic.
(A Level Boy, Old Tech Grammar)

***

GEMMA: I can only use Music Time Deluxe and I think a couple of my friends are like that. He [Mr Clarke] talks about others like Cubase and stuff but we're just not sure how to use them [...] I mean, some of the boys, like Robert, he's really, really good with the computer and you listen to some of his stuff and it's really fantastic [...]

VA: So why do you think he's particularly good then?

GEMMA: He was taught the sequencers [...] and he spent hours doing one of his compositions [...].

VA: Do you see yourself getting that into computers?

[24] I would like to thank Ross Purves for his helpful remarks when I first began working through these ideas.

GEMMA: Compared to that [the software she described Robert using], I mean Music Time Deluxe isn't that, it's pretty basic really. It's just mainly putting things on. You can't really experiment with it. It's just, you just put something on and it plays it back and prints it out. That's all it does [...] I haven't been taught how to use any of the other pieces of software so I'm limited to that really.
(GCSE Girl, Old Tech Grammar)

From the comments above, both boys and girls make a distinction between the 'simple' notation packages such as Music Time Deluxe and Sibelius leading Carolyn to observe that she does not really think of Sibelius as a 'real' technology compared to the music technology used by her brother. Gemma also negatively evaluates Music Time Deluxe when compared to Robert's use of the sequencing package Cubase which enables him to 'experiment', whereas her perception of Music Time Deluxe appears to be little more than a storage device: you input the notes, they are played back to you, then you print out the music. As Gemma notes, 'that's all it does'. In fact, Music Time Deluxe does have a basic editing facility but it not a dedicated package in the same way as Cubase or Logic leading Craig to assert that Music Time Deluxe was 'rubbish'. However, none of the girls mentioned using the sequencing capabilities of Music Time Deluxe, usually stating that they worked with the score editor which, like Sibelius, was notation-centred.

Even when boys do use Sibelius, there is a tendency to emphasize their musical skills to counteract what they perceive as the simpler aspects of the program:

JACOB: Yeah. I don't sort of click it in, like one note at a time, I actually play it in, play the chords, play the whole thing.
(A Level Boy, New Tech Comprehensive)

**

EDWARD: Well, Sibelius I've had for quite a while. I've had it since it first came out, my parents bought it for me, so I've been using that for a while now and I can do a lot on that [...] On things like Sibelius, if you're a competent pianist like me, you can just press

the record button and you can just play it in and it'll all come up very quickly.

(A Level Boy, Old Tech Grammar)

**

PETER: Well, Sibelius is fine for what I need it for. But what really matters are the chords. If you're composing a piece you need chords, so I'd probably concentrate on playing in the chords and then sort of do, then write a melody over that.

(A Level Boy, Crossways Independent)

This compares sharply to Joanne's comments about using Sibelius and her negative appraisal of her skills:

JOANNE: Sometimes I play it in if it's quite simple but if there's like complicated bits then I'll usually click it in or I can play a bar and if it's repeated I'll just copy and paste it all the way through. I know I'm not gonna get the rhythm right so I'll just click it in 'cos it saves a lot of time.

(GCSE Girl, Old Tech Grammar)

Comber et al (1993:130) make a similar observation whereby the masculine perception of the simplicity of music technology led one boy to comment that 'You don't have to be a musician to make music now. Using computers, anyone off the street can just make a number one hit. I like acoustic instruments, that's what music's about really, not all computerized sounds'. The more software resembles traditional notation, the less it is perceived as requiring any particular skill and was derided as being 'easy' or 'rubbish' compared to 'real' sequencing packages. There is little kudos attached to using what are perceived as 'simple' forms of technology and these notational packages may have acquired feminine connotations because of their association with classical music genres and traditional instruments. Ann Southam, a Canadian composer (McCartney, 1995b) describes her first experiences using music 'electronics' in the University of Toronto studio in the 1960s working with oscillators, filters and loop machines and found this a very positive experience. However, she makes the comment that 'Fortunately, I think the equipment was so unsophisticated that it couldn't

possibly be thought of as mathematical' (and therefore not associated with the complex and masculine). She continued working with new electronic instruments into the late 1980s but gradually stopped working in this way because she lost affinity with the instruments because they removed the 'hands-on approach' she had developed working by hand and ear: 'Working by numbers on a computer screen – I just couldn't relate to it…I just couldn't relate to looking at the sound'. Wajcman asserts that:

> Men's relationship to technology is defined differently to women's. Cultural notions of masculinity stress competence in the use and repair of machines. Machines are extensions of male power and signal men's control of the environment. Women can be users of machines, particularly those to do with housework, but this is not seen as a competence with technology… Women's identity is not enhanced by their use of machines.
>
> (Wajcman, 1991: 89)

Consequently, the mere engagement with machines is not, of itself, enough to secure an acceptable technological identity. It is the nature of that engagement and, as I have suggested, using gender appropriate software is one way that boys and girls construct acceptable identities. Software perceived as requiring less technological skill to manipulate is aligned with femininity and may lead to boys rejecting it. Using notational software appears to offer boys very little in the construction of masculinity, which, unlike femininity, must be associated with technology that is perceptibly more challenging, complex, skilled and conferring status.

4.3.2 'Masculinizing' Technology

As I have noted, an important aspect of the construction of masculinity is through perceived ability to manipulate sequencing software as requiring higher levels of

technological skill:

VA: Tell me why you think Alan is good at using technology?
EDWARD: Well, he's a good musician and he does a lot at home as well I think. I don't really know him too well but he always seems to know what he's doing in the studio and that. I think it's quite a big hobby for him. He does a lot of composing in his spare time on kind of Cubase and programs like that so he's got like a better background and knowledge [...] He just seems very competent when he's using the computers and recording equipment.
(A Level Boy, Old Tech Grammar)

**

VA: Why do you think Alan?
CRAIG: I dunno. He just seems to know how everything works, he's just picked it up. Don't know why. Maybe he's read it or... I dunno.
VA: If you get stuck do you actually ask him for help?
CRAIG: If he's around yeah. If he's not around I try and figure it out for myself but if he's there I'll ask him. He usually knows.
VA: So why do you think he's better than you?
CRAIG: Dunno really. I think one of the reasons is his multi-track is very, very good, so he obviously knows quite a bit about the recording side, like setting up and stuff.
(A Level Boy, Old Tech Grammar)

Game and Pringle (1984) suggest that it is necessary for men to maintain the 'mystification of machines' in order to preserve not only male jobs and wage rates but the symbolic association of men's work with skill. If women worked on the machines, it would show how stationary and repetitive these tasks were but by insisting that only men work with them, this further loss of control of the work process could be disguised. Thus, men are able to represent the power of the machine as theirs and experience themselves as having a monopoly on 'technical expertise' as status and skill are intrinsic to definitions of men's work. Within the music classroom, where both boys and girls now use technology, it may be that boys need to experience themselves as expert sequencers to enable them to (re)claim the symbolic association of technology with masculinity. As Bayton suggests, in jobs that are perceived as 'endowing masculine status, if women start doing them, such status conferral will be undermined' (1998: 8). The separation

of acceptable 'masculine' and 'feminine' technologies is bound up with the meanings that are attributed to that technology in terms of whether or not engaging with it affirms our notion of how technological skill and expertise are implicated in the construction of a gendered identity. It has been noted that younger girls are often more enthusiastic about using music technology than adolescent girls and it has been suggested this may be because the technology involved concentrated on electronic keyboards which are perceived as a musical instrument and not a technology (Colley et al, 1997). Consequently, if adolescent girls are expected to use more complex sequencing packages defined as masculine technology, this may prove highly contradictory for their sense of feminine identity. As I indicated earlier, adolescents appear to conform more overtly to cultural assumptions about what is appropriately masculine or feminine than their younger counterparts do.

Within my study, boys were more likely to talk about software packages such as Cool Edit Pro, Logic, Cubase and Reason. They presented themselves as particular types of musicians and composers. They were often involved in bands and did not consider themselves classical musicians (even though they all had at least Grade 6 and above on an instrument – piano, double bass, saxophone and violin). Some of the boys who inhabited the music studio at Old Tech Grammar (discussed in Chapter 5) and some of the students made these types of comments from New Tech Comprehensive who maintained a particular type of masculine identity as both technologically knowledgeable and musically adventurous, working with 'electronic music':

> **CRAIG:** It's because I record guitars and stuff. 'Cos what I do on computer is mainly stuff for my brother's band, then I use Reason as a drum machine and record that as a Wav file and then record guitars and bass. Obviously, like electronic stuff like Reason, the drum beats are all tab operated so if you have 16 tabs and you can click on 1,5,9 and 13 then it just does that [claps], the first beat of every note, it's just divided into semiquavers so that's quite good with electronic stuff.
>
> *(A Level Boy, Old Tech Grammar)*

**

JACOB: I always use the keyboard and for most of my songs I usually have an alto sax playing the sort of leads. That's mainly what I use but I don't usually play the sax to write. I put it on there, I've got the program Reason and that's um sort of pop/dance music based and I made about ten songs on there since I got it 'cos I enjoy using that program a lot. I've made ten fairly different songs on it and it's really good.

VA: What do you like about it [Reason]?

JACOB: Probably because it's different from all the others. It's a hardware simulation instead of just a program 'cos it's got the um, it's a sequencer and it's also got the actual synthesizers and samplers. You can actually see them and if you sort of, if you press the tab, you can see behind the back and see all the wires. It's really good.

(A Level Boy, New Tech Comprehensive)

In the case of the software Reason, an ideal *male* user is also implied through its description and appearance on the computer screen, a description of which reads:

> Here was software that even traditional desk-bound engineers could relate to, the wonderfully designed interface transposing all the features and accessibility of a hardware rack setup into highly useable software.
>
> (Issue 10, Music Tech Magazine's Guide to Reason 2.5.3)

Sound Engineering remains a very male-dominated field where entrenched notions of masculinity prevail (Sandstrom, 2000). Therefore, I suggest that the way this software is designed panders to the perceived interests of a particular male user – one who is interested in being able to 'see' the internal workings of the virtual mixing desk. A view of the interface shows virtual wires and plugs (like a real mixing desk). Various controls allow you to use the 'Damage' knob, an input gain control which enables users to reach 'even more ear-battering sounds'. Three-band EQ and a Body section places sounds in a virtual resonant space, which are good for speaker simulations of 'boxy tones' that are good for 'aggressive, nasal drum loops' and are often used to create dance music forms. Consequently, I suggest that these design features reproduce the symbolic

gendering of the archetypal male user with its emphasis on loudness and aggression:

> In general, when boys in schools perform 'popular music' or 'fast music', play drums and electric instruments, or manipulate technology, they are furthering a symbolic representation of their masculinity... Contrastingly, when girls sing, and when they play 'slow' music, or 'classical' music on orchestral instruments, they are furthering a powerful symbolization of their femininity.
>
> (Green, 1997: 185)

The design features of the software make assumptions about the potential user and this user is normatively male. As Frith and McRobbie (1978/9) note, male forms of rock music are often loud, aggressive and rhythmically insistent constructing a desirable identity of heterosexual masculinity.

Males' identification with this form of music can also enable them to engage with simple digital technology without fear of interrupting their masculine identity. Patrick from New Tech Comprehensive stated that 'I do use Cubase for composing although I find it difficult' then contradicted himself by asserting that 'it's simple to use; you can put stuff straight into the computer'. However, I did not see him using the computer during my observations and his teacher mentioned that he hardly ever used Cubase in lessons. Within the culture of New Tech Comprehensive, it might seem his inability to demonstrate the requisite expertise with regard to the technology might have proved difficult for him. However, it became clear that Patrick's way of dealing with this was to circumvent computer technology altogether. He invested in an identity that was deliberately non-technical (in a digital sense) but he managed to maintain a subject position that was acceptable within this particular classroom culture by eschewing the use of affirmatory 'masculine' software' in favour of presenting himself as a 'Rock' musician - an alternative form of technology. Women are not expected to engage with the actual technologies of rock, such as electric guitars, drums and amplifiers

(Bayton, 1997; Cohen, 1991) and those who do are considered to be risking their femininity (Bayton, 1998), reflecting deep rooted ideologies about women musicians both in the classical and popular music spheres:

> ...rock is associated with technology, which is itself symbolically interwoven with masculinity. Boys get given technological toys: girls do not. Boys' informal learning, in the home and amongst their peers, breeds a familiarity with, and confidence in, all things mechanical and scientific.
>
> (Bayton, 1998: 41)

Patrick chose to use a much 'simpler' technology, that of the minidisk player, to work with – the perception of 'simple' technologies that I suggested earlier might be associated with the feminine:

VA: Can you describe a piece of music you've written recently in as much detail as possible?

PATRICK: Well, the last composition I done was a film piece. I started it off with the guitar with just a basic tune and I just extended on that. I had an image of, well the sound of my piece was to fit a kind of desert scene, on a motorbike going along. There's a woman who's trying to get home and the husband's been, like, killed, but she don't [sic] know about it. And I put, like, xylophones in it and some drums.

VA: Did you do that on Cubase?

PATRICK: No. I done it on this recording thing. And I was still playing my guitar.

VA: So when did the computer come into the process?

PATRICK: I didn't use it in my last piece actually. I prefer just to use the recording stuff.

VA: Just explain that to me. This recording thing you talk about.

PATRICK: The minidisk recording thing. You can get eight different sounds on it. I just played lots of different tracks.

(GCSE Pupil, New Tech Comprehensive)

At New Tech Comprehensive amongst the GCSE students, very few boys played orchestral instruments to a high level of proficiency with a majority being drummers and guitarists (over 70% stated they played in a band of some kind out of school). Therefore, Patrick's lack of technological skill did not compromise

his masculine identity which he maintained by constructing an identity as a 'rock guitarist', working in a way that might be seen as consistent with this type of music. This enabled Patrick to produce an alternative but acceptable masculine identity that was equally valued within the masculine culture of New Tech Comprehensive.

The interview extracts above illustrate how design choices can be made with gendered assumptions about the users in mind and show how the gendering of artefacts can also be *by association*, whereby the symbolism attached to technology influences our perception and understanding of technology. Therefore, it becomes apparent that preferences and uses of music software are an important way of expressing identity. Such arguments go some way to providing a more sophisticated analysis that does not see all technology as inherently masculine but acknowledges both the material and symbolic associations which contribute to the gendering of the artefact and thus removes the possibility of labelling all technologies as alien to women. These arguments are intrinsic to a socially embedded view of technology which explores how different social groups construct their own meanings around technologies and how the innate 'politics' embedded within the design of the technological artefact produces certain types of social relations.

4.4 Conclusion

In this chapter I have attempted to show the cultural and material factors that contribute to on-going notions of expertise and masculinity, and who was able to participate in the production of discourses of expertise. By rendering the girls largely silent in this construction, the values generated by males led to an environment that gave little merit to the values that girls attributed to 'expertise'. The cultural landscape and the discursive practices of the teachers and pupils work to produce this 'silencing' and is a situation found in a number of sites in which women's knowledge is undervalued. However, I noted that, despite having

technological knowledge and skill, the girls and female teachers, when in the classroom, have less power to actively position themselves as skilled users, and find themselves positioned by the male 'experts' as less competent and skilled users within a technologically oriented music environment. Consequently, within these classroom cultures, where technical skill in manipulating computers is highly valued, boys who are good at technology can position themselves as successful males. I argued that this was implicit in the values attached to the music software both in its design and in pupils' perceptions of its simplicity or complexity; these perceptions feeding into notions of what constitutes 'feminine' and 'masculine' technology.

CHAPTER 5: SPACES OF DIFFERENCE

5.1 Introduction

In this chapter, I will turn to the issue of space in the technologized compositional classroom. Space is commonly thought of as a fixed, physical container of social life, a space where things happen. However, recent theorizing about educational spaces[25] sees space as more than either a physical or social space but as an interaction between the two; not as a backdrop to social interaction but created *through* interaction with the social and as therefore socially produced and interpreted. The way in which space is organised in schools produces particular forms of social relations:

> Rather than being an arena *within which* social relations take place, space is made *through* the social – it is enacted and so continually created and recreated.
>
> (McGregor, 2004: 2)

As McGregor goes on to say, understanding space as socially produced reveals current social arrangements which produce and maintain power relations whereby individuals and groups use space to exert dominance – teachers over pupils, males over females (ibid:3). As such, this enables us to develop a politicised understanding of space by analysing the power relationships involved in the production of space. Within classroom spaces, teachers lay down rules and routines controlling pupil behaviour, movement and access to technologies and, in creating these structures, certain behaviours are encouraged or suppressed which function invisibly to reinforce teacher control (Coffey and Delamont, 2000). As McGregor (2004) asserts, ignoring how space makes a difference to schools and

[25] I would like to thank John Morgan at the Graduate School of Education, University of Bristol for bringing to my attention the recent work of social geographers who are interested in critically examining educational spaces.

education is a barrier to democratic relationships – it is not neutral but is (re)created through politics and ideology and is actively constructed through materially-embedded practices. As such, it becomes possible to examine the gendered production of compositional spaces and examine to what extent these are reproduced or can be reconfigured around digital music technologies.

5.2 Women's Compositional Spaces

The cultural practices around composition have produced a symbolic, material and ideological distinction between the private 'feminine' sphere and the public, professional 'masculine' sphere, the latter held in greater esteem than the former. As I observed in the previous chapter, men's public 'work' and women's 'domestic labour' is constructed as serving different functions and this leads to a disparity between the value and status accorded to their labour. This allows us to draw a direct parallel with the situation many female composers find themselves in. Historically, women's music is heard less frequently in public spaces, receiving far fewer public performances than their male counter-parts:

> ...it is important to note that the gendered associations of public and private mean more than site, agency, and social status. They have important metaphoric and epistemological implications as well. They symbolize psychic space: women and private as reined in and bounded, men and public as free and open...Public represents an epistemological space without limits, and therefore privileged. Private suggests boundaries of knowledge and access to knowledge; it implies a lesser justification for knowledge and authority. Musical activity rooted in the private, therefore, has less cultural justification and presumably less value than the workings and agents of the public sphere.
>
> (Citron, 1993: 104)

One of the most important 'private' spaces was the domestic *salon* – small, private musical gatherings which originated with women from around the end of

the seventeenth century and became integral to nineteenth century aristocratic society. Although it supposedly replaced music of the royal court - a masculine domain - by being situated in the home, Citron argues that, as a female domain, it 'represented an important site of feminine culture' and could function as 'a meaningful sign of creative authority' (ibid: 106).

This private arena was an important musical outlet for many gifted and musically educated women. However, although they composed, sang, played instruments and conducted they never performed in public or published their work, their audience largely restricted to friends and family (Reich, 1993) and the music they often produced in these spaces reflected the unequal access they experienced to high quality instrumental training compared to male musicians. As Reich (ibid) notes, although women could nominally study any subject in the music conservatories of nineteenth century Europe, they were often limited to voice, piano and harp:

> The appeal for students [for the new music school] was made only to boys; girls were not even considered, because at that time [1857], the idea of females participating in public concerts was quite unthinkable. According to the point of view of the time, only singing and piano-playing were fit subjects for girls and women; violin and certainly cello, much less a wind instrument, were quite unsuitable for them.
>
> (Juker, 1958, in Reich, 1993)

One striking example of a woman who was able to produce more large-scale works is that of Fanny Hensel, elder sister of Felix Mendelssohn. Like her brother, she received an excellent musical education and was an accomplished pianist. Her musical output was prodigious composing some four hundred works in a range of forms from songs to orchestral and choral works. However, whereas Mendelssohn went on to become a professional composer, this path was not considered appropriate for Hensel; her musical outlet restricted to the family's bi-

weekly musicales – Sonntagsmusiken – in which she acted as Musical Director. Despite support from her mother and her husband to publish her work, her brother, although happy to support her work as a pianist and composer within the home, was not prepared to sanction any possibility of her becoming a professional composer (Citron, 1993: 106; Reich, 1993: 140-142) and thus entering the public world in which her work would receive a wider audience.

Composition was viewed as a masculine occupation and historical references to female musicians are more likely to find them involved with music as singers or instrumentalists (Green, 1997); a situation that is still in evidence today. A recent survey showed that the 2002 BBC Promenade Concerts only featured three women composers out of one hundred and twenty six. There were no women conductors and only nine out of fifty-one instrumental soloists were women[26]. Similarly, a mini-survey of the popular music media carried out by Bayton (2001/2002) showed a comparable disparity. She found that appearances of female instrumentalists were scarce but appearances of female singers were common. Having carried out similar surveys in 1988 and 1996, Bayton found that there was little improvement in women's presence and representations in the popular music press in the intervening years. Women are invariably portrayed either as performers (usually singers) or consumers (in the shape of 'fans') but rarely as producers of popular music (Cohen, 1991).

Those female composers who do embark upon a professional career can be met with suspicion for stepping outside their 'proper' societal roles:

> For...wanting to stray away from the 'natural feminine' path. The constant reference to the implicitly unchangeable role played by women's temperament and nature underlines the perceived threat the female composer presents to traditional notions of femininity.

[26] The composer Jenny Fowler carried out the study reported in a short paragraph in Classical Music (22/6/2002). Despite several attempts to find out more about this study, the magazine publishers failed to answer my e-mail requests therefore I am unable to provide more detail about this study as I cannot ascertain its original source.

(Halstead, 1997:147)

Many women did strive to achieve the professional standing of their male compositional counterparts but upon entering this 'masculine' public space were likely to find themselves negatively critiqued. One reason given for this is that within patriarchal society, the concept of creativity, when applied to males, involves the mind and the conception of the creative work is associated with the mental. For females, through a verbal sleight of hand, creativity becomes associated with procreation and the physical (Stanford Friedman, 1989 cited by Citron 1993). Within Western discourse, culture and nature are positioned as opposites:

> Culture is privileged and associated with men, while nature is inferior and linked with women. Culture encompasses knowledge and human-made social structures. Nature implies a pure state unmediated by intellect.
>
> (Citron, 1993: 48)

This distinction between male/culture and female/nature produces a hierarchical relationship that underpins the ideology of the male, 'genius' composer and 'his' association with rationality and the mind. Although many of the characteristics of the 'genius' are stereotypically 'feminine' (such as intuition, emotion and imagination) women are excluded from this category (Battersby, 1989). Although emotion is associated with creativity, when applied to females, emotional means irrational, emanating from the female body, and women's inability to control their emotions means they are better suited as interpreters of (men's) music than composers (Upton, 1982). Unlike women, who are supposedly dominated by their emotions, men are able to control these emotions, emotions that can then be outwardly expressed through music. Unlike the rational man who is in control of his body, her body controls the emotional woman (Green, 1997).

Green (ibid) argues that this symbolic association of the masculine with the mind enters the delineation of music and it is this that conflicts with patriarchal

definitions of femininity and the natural body – when women compose, the body disappears and this 'metaphorical, delineated display of mind conflicts with her natural submission to her body' (ibid:88). This shapes a gendered discourse that aligns composition with the rational, objective masculine mind as embodied by the male composer.

Green (1997: 98) also argues that, in evaluating women's compositions, critics employed a 'pre-existing pedagogic discourse invoking masculinity and femininity'. When accorded praise, the work of female composers is often placed within a masculine framework, their work being judged along the lines of 'men's music'. The heavy weight of criticism against their work means that women's music is also judged against a backdrop of unacceptable female 'femininity'. By her own evaluation, the nineteenth century composer Clara Schumman, while acknowledging that there were some good passages in her g-minor Trio, Op 17 (1846), stated that 'naturally it is still women's work, which will always lack force and occasionally invention'. Clara went on to state that, compared to her husband's Trio hers 'sounded quite effeminate and sentimental' (cited in Citron, 1993:56). Citron (1993:57) speculates that the ambitions of Clara's husband, (Robert Schumman) to be a successful composer, may have intensified Clara's 'understanding of societal notions of proper roles: men create, women re-create' and may have contributed to Clara's rather negative assessment of her own compositional efforts.

While appearing to praise Ethel Smythe's opera because of its full-blooded climaxes and excellent use of the orchestra, Smythe becomes an honorary man as the following comment shows: 'the gifted English woman has successfully emancipated herself from her sex' (Neuls-Bates. 1982: 226). Both virtues and defects in women's compositions are ultimately the result of her gender – when she is noisy rather than sonorous, she is eminently feminine (ibid). A seemingly complimentary review of a work by Ruth Gipps asserts that the work is successful because she does not make the mistake of trying to beat male composers at their

own games. Her work is defined as having 'feminine grace and delicacy' (Halstead, 1997: 148) and, as Halstead notes, it is because she is not deviating from her femininity and thus not seeking to 'beat' male composers that the work is received favourably.

The music itself is sometimes a secondary consideration within such reviews (Halstead, 1997). In response to a performance of Minna Keal's symphony at the 1989 Promenade concerts, one reviewer comments on Keal's small physical size, her age (80), her weight and her outfit. As Halstead points out, could we ever imagine reading a similar description of a male composer that focused on his appearance at the expense of his music? And yet, such examples remain rife within current music publications. In the music magazine 'Muso' (2005), one of the leading articles focuses on the young and highly successful composer Tansy Davies. Tansy's music is infused with an eclectic mix of disciplines and genres, from classical contemporary music to funk and she has been one of the most successful contemporary composers of her generation. Her work has been commissioned by the BBC Scottish Symphony Orchestra, the London Symphony Orchestra and the London Sinfonietta. However, although these achievements are mentioned, the first five paragraphs of the article focus solely on her clothes and appearance:

> A glamorous young woman is sauntering around the stage in tight cut black combats, kitten heeled boots and a bright red fitted mini dress… 'I'll have to keep my brain in gear – I've been lugging amps and guitars up and down the stairs,' she laughs, leaning her delicate frame back in her chair. The neck of her red top is wide-cut, revealing two seductive black vest straps and a pair of lean shoulders underneath.
>
> (Muso, 2005: 14)

Furthermore, although the composer is surrounded by electric guitars, samplers and keyboards and extensive amounts of technology, the fact that she will be

playing these instruments at a concert that evening with her newly formed contemporary music trio is not mentioned until nearly the end of the article. Her physical attributes and her mode of dress are considered more note-worthy than the music she writes or plays. Another article in the same magazine compares two up-and-coming young conductors and further exemplifies how women's musical contributions are deemed secondary to their physical appearance. The picture of the male conductor takes up one third of a page while the remainder of page is taken up with an article detailing his achievements and musical background. He is wearing everyday clothes and holding a baton in his hand as if he were actually conducting an orchestra. In comparison, the picture of the female conductor takes up a two page centre-spread and she only warrants a few brief lines about her professional experience. She appears to be wearing a white silk nightdress while lying on a white fur blank fully made-up with painted nails; artfully arranged hair hangs seductively over her eyes as she looks up at the camera. She appears to be more ready for bed than she is for conducting an orchestra, which is no doubt what the image hopes to imply. The sexual overtones implicit in this image are exacerbated by the salacious tone employed in the opening paragraph:

> Estonian conductor Anu Tali heads the Nordic Symphony Orchestra, which she and her identical twin sister (now there's an image) founded together in 1995.
>
> (Muso, 1995: 38)

Invoking both sex and sexuality, Anu Tali is reduced to an object of sexual desire rather than focusing on her abilities as a talented young conductor.

The above discussion highlights how women's compositional and musical spaces are circumscribed by societal expectations of women and patriarchal notions of what constitutes acceptable forms of femininity in these spaces. One of the consequences of women's marginalized position within professional, public

compositional spaces is that their music rarely finds its way into the canons of Western art music – they are rarely mentioned in texts that espouse 'great composers' or 'great works'. This is extremely significant as canon formation is a political process wherein the values encoded within the canon help to perpetuate the ideology of the dominant group; women have very little power in the formation of the canons of Western art music and so 'the canon is still overwhelmingly male in its membership (Citron, 1993: 41). In musicology, canon formation is largely interested in what music is put in and what music stays out; what music is valued and why some musics are excluded (Bergeron and Bohlman, 1992).

Feminist analyses of the canon, alternatively, are interested in *whose* music is excluded from the canon and who controls the process of canon formation. Any trawl through a traditional 'History of Western Music' anthology reveals the imbalance between men's and women's representations and practices as composers[27]. Despite the small body of work that has addressed the issue of female composer's exclusion from the musical canon (Citron, 1993; Cook and Tsou, 1994; Solie, 1993), their continued invisibility in school textbooks and curriculum materials is palpable and extremely worrying (Koza, 1994). For example, 'Sound Matters' an anthology of listening material for GCSE music used by many classroom practitioners, cites only two women composers out of forty-seven musical examples taken from the late Renaissance to the Twentieth Century. As this discussion has illustrated, compositional spaces are created and maintained through gendered social relations which hold sway in constructing what spaces are appropriate for and available to male and female composers.

Given that the construction of technological spaces reveals a similarly gendered alignment between men and masculinity, it is important to examine what this might mean for women in computer-focused compositional spaces. This is

[27] There are a number of very good sources now available that examine the history of women in music; Bowers and Tick (1986); Fuller, (1994); Jezic (1988); LePage (1980) Neuls-Bates (1982); Pendle (1991).

especially pertinent in light of arguments made for 'new' digital spaces as being potentially empowering and democratizing for women. In the following section, I explore these arguments in some detail and relate them to the music classroom.

5.3 New Technological Spaces

One of the most pervasive arguments currently in circulation within cyberfeminist theorizing is that, unlike physical, material spaces, new 'cyberspaces' offer the possibility for women's unfettered engagement with digital technology in a space where gendered social relations can be transcended and new social and gendered identities can be constructed. The cyberpunk science fiction writer William Gibson first coined the term 'Cyberspace', epitomized in his novel Neuromancer (1984). Recently, this term has become part of the language of cyber-cultural theory and cyberfeminism that seeks to investigate the virtual world. A world where boundaries do not matter, geography and distance are irrelevant. In this 'realm of pure information, filling like a lake, siphoning the jangle of messages transfiguring the physical world (Benedikt, 1993)[28], the cyber world of the Internet and on-line communications is offered up to us as 'a habitat of the imagination...an inevitable development in the interaction of humans with computers' (Novak, 1991). Arizpe continues to wax lyrically in this vein asserting that 'Imagination without technology can lead to utopias in the desert...we know that the new information and communication technologies will bring changes we cannot conceive of today...if present trends continue, most of the negotiations, adaptations and creative solutions to emerging problems will be dealt with in cyberspace' (1999: xiii).

Like the determinist discourses of music technology discussed in Chapter 2, this

[28] Benedikt's (1993:1-25) introduction provides a philosophical account of the ways in which 'cyberspace' can be conceptualized. Ultimately, he acknowledges that cyberspace does not really exist as he describes – it cannot. What we term 'cyberspace' is merely an attempt to make visible what is inevitably an invisible space.

new 'cyber' space appears to float free of any form of social context. But can we really make the claim that digital technologies can reconfigure gendered social spaces, unhindered from material constraints as cybertheorists insist? A defining characteristic of computer technology is its tendency to construct an apparently autonomous, individual environment. Turkle's research into Internet use suggests that some users strongly perceive internet spaces in this way:

> The rooms and mazes on MUDS (multi-user dungeons) are safer than city streets, virtual sex is safer than sex anywhere, MUD friendships are more intense than real ones, and when things don't work out you can always leave.
>
> (Turkle, 1995: 244)

However, for many women, this 'new' social space is not without its problems as Harcourt (1999) recounts about her 'Women on the Net' (WoN) project in which women (and a handful of men) from a range of backgrounds (academics, women activists, NGOs) engaged in on-line debates to discuss their work and lives. From these discussions, there gradually emerged several dissenting voices amongst the group as this space began to resemble yet another formation of the politics and power relations they experienced in their material existence. Many 'non-academic' women felt silenced and alienated from the prevailing discourse which they stated they never used in their 'normal' dealings with individual women and women's groups. One woman stated that she felt she had to change the way she talked in this space to her 'cyber-friends' from the way she spoke to her 'fleshly' friends, and felt undermined and 'ignorant' at having to ask what certain words meant. It becomes apparent, therefore, that cyberspace does not necessarily provide a wholly liberating space for women nor does it challenge the social relations of the wider society: more powerful women (in relation to other women) still assert their power through their use of language and academic position. In this scenario, the issue is about who has the power to control the dominant discourse.

We must not lose sight of the fact that communication networks and the Internet have a political dimension because of the *people* who use them and the social groups and institutions of which they are part. This is an important issue when we consider that Internet availability is often only accessible to the privileged classes due to the high cost of Internet connection, lack of computers and telephone lines. In the Philippines, for example, availability is largely confined to the 'traditional elite' who are educated, urban-based and largely male (Bautista, 1999) and is exacerbated by the fact that the main language of the World Wide Web is English. Alshejni (1999) highlights the problems encountered by Arabic women, such as the fundamental problems concerning women's education in the Arab world (the illiteracy rate for women is over 60%). Even where educated Arab women, largely from NGOs, do have an opportunity to express themselves freely online, certain topics might be potentially dangerous in the public sphere. These are the real dangers some women face when trying to move between virtual and material spaces.

There are obviously some positive benefits for women who enter these on-line spaces but what becomes apparent is that the users of this technology do not leave behind their cultural and social experiences. The discursive communities they encounter may share a language or common values that are not available to all contributors. Who is able to dictate the discursive framework and who is allowed to participate in these encounters reproduce the same material constraints women experience in the 'real' world. As such, it could be argued that new technologies 'supplement rather than substitute for existing practices and forms of organization' (Woolgar, 2002: 16). Unequal and power-laden gendered social relations do not necessarily disappear in cyber-space. However, the hyperbole - or 'cyberbole' as Woolgar (2002) terms it - surrounding cyberspace and on-line communications frequently offers an uncritical, almost reverential view that eschews the social implications of a space that is *constructed* via the practices of the social actors using and inhabiting this space. As such, it is not 'free' from the cultural and material strictures that are constructed in the 'real' world:

> Social divisions and distinctions have remained largely untouched by the massification of a whole range of computer-based technologies, and the Internet will be no different. It owes its existence to the desire of info-rich actors to talk and share information and knowledge with other info-rich actors.
>
> (Haywood, 1998: 23)

As Haywood (ibid) goes on to observe, existing social divisions and inequities within the material world are merely reproduced in on-line spaces. Being in cyberspace does not preclude the fact that some people and social groups have more power than others do in the 'real' world, which the virtual, cyber-world replicates. Consequently, Shilling offers the helpful suggestion that it is better to stop thinking about cyberspace and physical space as opposites but develop an awareness of 'how they interact and constitute extensions of each other' (2005: 194).

5.3.1 Gendering Technological Spaces in the Classroom

Shilling's (2005) suggestion is especially pertinent when applied to the music classroom because the distinction between cyberspace and physical space is not easily disentangled. In light of my discussion in the previous chapter, it is apparent that the gendered social interactions that occur in material spaces have a palpable effect on how technological spaces are constructed - gendered social relations that are reproduced in both physical and 'cyber' spaces. Pegley (2000) argues that we pay insufficient attention to the way music classrooms, as new technological spaces, are constructed. Our focus is aimed at examining the *effects* of computers on pupils' literacy and creativity rather than examining the gendered interactions that produce classroom spaces. Her research examines how boys' and girls' interactive patterns changed depending on their location - a term she employs to describe six specific physical technological spaces within the music

room. These locations focus on literacy, sequencing, composing, MIDI wind performance, recording and integrated arts performance. She argues that the restructuring of physical space has a palpable effect on a pupil's sense of place within it. She observed that boys' and girls' negotiative styles altered as their groups moved around between the different music technology areas and were related to the actual technological location they were in rather than to dynamics of the group in which they were working, which remained the same throughout. She asserts that pupils' musical voices are shaped by their personal constructions of place, and these constructions are highly gendered. Pegley found that girls were more likely to favour locations that involved less manipulation of computer software and encouraged personal interaction whereas the boys appeared to favour more technologically-oriented locations that featured individual activities (ibid: 311).

In an early study of secondary school computer clubs, Culley (1988) noted that fewer girls than boys took part in these optional computer activities, making up less than 10% of the club's membership. She attempted to account for this disparity by highlighting a number of factors. Computer rooms were generally thought of as 'male' territory, the girls stating that the boys' attitudes and behaviours often made them feel uncomfortable. To compensate, a number of schools provided 'girls-only' time (which was often supervised by non-specialist female teachers) but this led to the open sessions effectively becoming boys-only sessions (usually run by the qualified male computer teacher), which had the effect of further reducing access and teaching quality for the girls. Other research has also suggested that in an effort to support girls in single-sex classes this allowed the development of more macho cultures in the boys' groups which ran counter to the intention to reduce sexist practices (Kenway et al, 1998, cited by Paechter, 2000). Culley found that many of the male teachers had 'hobby' interests in programming similar to that of their male pupils. She also noted that the textbooks were often sexist, with men often presented in a supervisory role – for example, a male supervisor leaning over a female (subordinate) typist.

Drawing on my own data, I observed similar constructions of technological spaces, especially in areas where males have more power to construct technological spaces as their own, thereby making them 'off limits' to females. This highlights the *material* power relations produced in and around technological spaces. At Arts College and Old Tech Grammar, all composition took place in the music technology suite. Crossways Independent also had a room in which music technology was situated but there were fewer computers, as was the case at New Tech Comprehensive but throughout my visits the rooms where the computers were located were very male-dominated. Incidences of female use were far fewer and the girls could often be found in the practice rooms, trying out ideas on the piano and notating them on to manuscript paper. At New Tech Comprehensive, there were numerous occasions when groups of boys were huddled around the computers but only one occasion when a girl was working at a computer, and she was working alone.

As I pointed out earlier, it might be assumed that the computer, as a potentially 'private' space, might offer more flexibility regarding who uses them but when computers are situated in very male-dominated physical spaces, girls appear to feel less comfortable inhabiting such spaces. There is a perception that computer rooms are 'male' territory, which many girls find to be an alien space as boys' attitudes and behaviours tend to dominate these environments (Culley, 1988). Watching a group of boys huddled round a computer playing a game called *Incredible Machine,* Orr Vered (1998) observed that the process of play was very loud and energetic; there was a lot of calling out and 'directing from the floor' – a very co-operative form of play but nonetheless peppered with much noise and shouting. Of course, girls can be noisy too but the social context affected girls' willingness to play in this environment. They often watched but rarely actively participated in the all-male groups, one girl stating that '...they're always yelling at the people who are like wrong. And I don't wanna be yelled at because I don't

wanna be wrong. 'Cuz like whenever I like think of an idea, and I like tell them, and then if I'm wrong, then they'll probably like start yelling' (ibid: 55).
One of the GCSE girls at Old Tech Grammar expressed an interest in using a particular piece of software (she could not remember its name but she had 'heard' about it) that included audio input:

VA: Right, so this audio thing, was that for instruments and voices?
JOANNE: Yes… I've never gone into all of that.
VA: Oh, you haven't used it?
JOANNE: No, not really.
VA: Why?
JOANNE: Well, that's in the studio, generally and I don't go in there.
(GCSE Girl, Old Tech Grammar)

It transpired that this small recording studio was mainly used by four boys doing Music Technology A level (two of whom were also doing Music A level) and, during my observations I came to understand how Joanne's perceptions of this space as highly gendered prevented her from engaging with the technologies in there. Two examples exemplify this from my own attempts to gain entry. On the first occasion, all the students had been completing the questionnaires in the main technology suite. Having completed them, the boys left and went into the adjoining recording studio. Having collected the questionnaires I followed them to find out when their free periods were so I could organize interviews around their availability. As I walked into the studio one of the boys walked towards me making it impossible for me to enter. I eventually had to take up a position in the doorway while they continued talking and laughing. They gave me the information I needed but did not respond to my questions about what they were working on. I felt that I was interrupting and that I was not welcome and, as there was no-where for me to sit and watch, I left as I began to feel uncomfortable at the position they had put me in both physically and symbolically. I attempted a second visit when there were only three boys in the studio thinking my inability to gain entry might have been affected by lack of space. But again, the physical

positionings of the boys within this space left me hovering in the doorway once more. The boys had taken control of this space both physically and symbolically and even I, as a supposed 'authority figure' i.e. an adult visitor to the school, could not gain entry. Consequently, I did not attempt to go in there again.

At both New Tech Comprehensive and Crossways Independent, I noted that girls were very rarely seen around computers. At both schools, I only observed one girl working at a computer during all of my visits (twelve in total for both schools). I asked the A level teacher at Crossways Independent how much technology was involved in composition classes and he said that his students rarely used it. He stated 'there's not much of a computer culture amongst the A level students although it's changing in the lower years'. However, the questionnaire responses revealed that two boys and five girls in a class of thirteen students actually had access to a computer and compositional software at home. When I pointed this out to the teacher, he was very surprised especially as he had assumed that the girls, who he stated were all 'classically' trained (with one exception), tended to compose more 'traditionally'. When asked if he had noticed any gender differences in who tended to use the music suite most, the teacher at Crossways Independent asserted that he did not believe this was actually an issue. More importantly, the problem as he saw it was concerned with increasing ICT provision in the music suite and having access to a dedicated technician:

> With the half-hearted technology we have at the moment we are not actually quite ready to have a culture [...] Look at the difficulties we've got even getting the basic requirements so the kids can get onto the computer and do music and stuff.
>
> *(Teacher, Crossways Independent)*

However, I noticed that the music suite was always full of male pupils during composition lessons and two boys in particular (Ian and Nicholas) during the lunch-hours when I was there. When I mentioned that I never saw any girls in the music suite, the teacher merely put this down to lack of access:

> It's certainly there in those classes where both genders are present so girls tend not to use computers when there are boys around to stop them using it, whereas they're [the girls] perfectly happy to use them if there's no-one around [...] I think as soon as we have enough hardware the problem will pretty much disappear.
>
> *(Teacher, Crossways Independent)*

A similar point of view was expressed by the GCSE teacher at New Tech Comprehensive:

> Yeah. The boys tend to use the computers a bit more...we don't have much of a culture of computers yet but that'll change when we get more money, probably next year, and access won't be a problem.
>
> *(GCSE Teacher, New Tech Comprehensive)*

Although the teacher at Crossways Independent seemed to acknowledge that girls were less likely to use computers 'when there were boys around to stop them', he did not seem to think that this was particularly significant and that a few more computers would rectify the problem. It appeared not to occur to either teacher that the reasons girls were reluctant to enter these technological spaces was because of their identification as masculine spaces. By actively avoiding these spaces, girls removed the need to negotiate these spaces in which they were made to feel alienated and perhaps unable to express their feelings of uncertainty about technological aspects of the software and hardware.

In the public masculine sphere of learning, boys tend to dominate but it has been suggested that this can be problematic for them as well. Boys are supposed to be knowledgeable about technology and are anxious not reveal any 'lack' thereby 'having constantly to secure their position in the public sphere because expertise in the subject content constitutes part of their identity' (Elkjaer, 1992, cited in Stepulevage, 2001: 329). When working in the private space, around the computer, this is less problematic because boys no longer have to prove themselves. Girls, on the other hand, as 'guests' in the symbolically masculine

space public space, do not have to secure their position in the same way as their gender identity is not bound up with having to display technological expertise. Rather than having to negotiate these masculine spaces, my data suggests that girls took active steps to produce new technological space for themselves, by using music technology at home.

5.3.2 Technological Spaces in the Home

I had not set out to examine composition in the home as it was clearly beyond the remit of this study. The questionnaire data had gleaned information regarding the types of music software individuals used at home (see Fig 3) and gave some indication of the amount of time spent using it. However, it was during the interviews that a number of girls revealed their comparatively high level of music technology use at home compared to that at school, which I had not anticipated. Holloway and Valentine (2003) note that girls who had access to PCs at home have the opportunity to develop technological competence away from 'surveillance' and the often 'hostile gaze' of their peers and these girls inevitably become more confident users, a confidence that is not always reproduced in the classroom, however. Rather more, girls appeared reluctant to show what they could do in classroom situations in case they encountered difficulties that revealed things they felt they could *not* do, thereby exposing them to teasing by the boys if they could not perform at the right speed or level. My findings suggest that, like the girls in Holloway and Valentine's study, one of the ways girls circumvent the difficulties encountered within masculine spaces of technology is to engage with music technology in the home - a private space away from the glare of 'public' failure.

This in itself may appear equally problematic as this notion of 'public failure' could be interpreted as essentializing, further reinforcing the distinction between male/female and public/domestic spheres; a distinction that many women, and women composers, have endured over the centuries (Halstead, 1997; Citron, 1993; Reich, 1993). However, this is not my intention. Rather, I would argue, this

affords an *active* positioning that accords a high degree of agency to the girls involved. As I discussed earlier in relation to accomplished musicians like Fanny Hensel, the private sphere could be viewed as a positive site of women's musical activities throughout history. Although Hensel was unable to take up a professional career as a composer, she was able to exert significant power and influence over the acclaimed musical gatherings that took place in her family home. Indeed, this did not afford her the type of public, professional acclaim experienced by her brother, Felix Mendelssohn, but it did offer her a musical outlet over which she had considerable control.

By taking control of their own knowledge acquisition and musical development in the home, female composers are able to subvert and circumvent the masculine discourse prevalent in the classroom. Clearly, there is enormous scope here for further research but for now, I will address this issue within the context of my respondents' interviews.

Fig 3: Music Composition Software at Home[29]

TYPE OF SOFTWARE	BOYS	GIRLS
Sibelius	12	4
Cubase	13	4
Music Time Deluxe	0	3
Cakewalk	2	5
Logic	4	0
Reason	2	0
Cool Edit Pro	3	0
Fruity Loops	1	0
Sound Forge	2	0
Noteworthy	0	2
TOTAL	36	18

Orr Vered (1998: 46) asserts that, in similar ways to the classroom, 'home is also a highly structured social space' circumscribed by rules and regulations, social relations among individuals that dictate access to technology, such as the computer or video recorder. Even where there are computers in the home, they are usually located in shared spaces such as dining rooms and so on and are not the sole preserve of young people who usually have to share them with other family members. Therefore, computer use is likely to be a contested activity within the household (Facer et al, 2001) and so composing at home is not without its problems:

> **JOANNE:** I prefer to compose at home but as long as there's not lots of people around. It's not like in a quiet room of its own, it's in the living room and so if there's lot of people watching television I can't go in there. It gets a bit

[29] See Glossary for detailed information about each software program.

> annoying. Sometimes, if I'm on my own or someone's upstairs, it's alright.
>
> *(GCSE Girl, Old Tech Grammar)*

Furthermore, boys are more likely than girls to have personal ownership of a computer (Facer et al, 2003) therefore, despite the physical location of the computer within the home, the meanings that are ascribed to it can continue to align it with the males in the household. This produces a set of social relations by which hegemonic masculinity retains its privileged position by engaging with valued technologies such as computers. This serves to both materially and symbolically position females with technologies that do not confer any form of power or expertise within the wider social framework.

Although I acknowledge that this might indeed be the case in some instances, the girls who stated that they were more likely to engage with music technology in the home than the classroom appeared to claim the domestic setting as a very positive and empowering environment in which to engage with technology as evidenced by Laura's comments. Laura said she had the software 'Cakewalk' at home on her PC and said she used it for about two hours per week. However, when I asked her how many hours she used music technology at school she said none:

LAURA: I've got a computer at home with music stuff.
VA: And how much do you use that?
LAURA: I use that mainly for composition and stuff and a bit on harmony.
VA: And what about the stuff at school?
LAURA: I don't use it very much because there aren't any to use.
VA: What, even after school?
LAURA: Well, it's easier to go home.
VA: But you haven't got Cubase at home have you?
LAURA: No, not the same one but I can use what I've got.
VA: When you encounter technical problems how do you solve them?
LAURA: Look up the help bit and stuff and read what it says. You sort of go away for a bit and then come back later and it

usually sorts itself out. It's just a slow process of trial and error.

VA: Do you feel more confident now that you've got it at home?

LAURA: Yeah. It's easier now.

(A Level Girl, New Tech Comprehensive)

It is important to note, however, that despite instances of girls engaging with music technology at home, their numbers and amount of use is still comparatively smaller to that of boys. For example, when asked how much time they spent using compositional software at home, responses ranged from one boy's assertion that he spent around six to ten hours a week using technology at home to another girl's response of 'about ten minutes a month!' However, those girls who did show an interest in using music technology were more likely to engage with it at home than at school even if it was for short periods. Significantly, these included some of the same girls who expressed the highest levels of technological confidence in Chapter 3.

As I have noted, there was not an overtly technocratic discourse at Crossways Independent but the music computer suite was certainly a male-dominated space. However, the GCSE girls I talked to stated that they hardly ever used the computer music suite (and they were not observed doing so during my visits) asserting that they preferred to use their demo copies of the score-writing notational package Sibelius[30]. Karen and Dionne stated that they would work with their ideas at home then create a score of their work using the demo version of Sibelius. They would print off the score and bring it into school where they would continue refining their compositions at the piano during class time, which my classroom observations support. This meant they would have to input the notes again into Sibelius each time they had worked on their piece:

[30] These 'demo' copies of the software can be downloaded free from the Internet (the normal cost of purchasing the most recent package 'Sibelius 3' is around £400 and must be registered) and can be used in exactly the same way as a purchased package – such as inputting notes into a score, adding text and dynamics and being able to print out the resulting score – but work cannot be saved in this demo version.

Excerpt taken from 2nd Observation (GCSE), 7th March 2003: Crossways Independent:

Dionne is sitting at the piano in the second practice room. I go in and sit down. She has a computer-generated score to which she is adding inner parts by playing them on a piano. She says it's easier to play on the piano rather than clicking a mouse [a reference to the way notes are usually inputted using 'Sibelius' software]. She asks me to play the two upper parts so that she can hear them as she doesn't play piano very well. I play them and we talk about the intervals, some of which sound very dissonant, and she doesn't like them. I ask her to analyse what she's written. She then realizes why it hasn't worked. As a tuba player, she's more used to reading bass clef and has put the notes in the treble clef as if they were in the bass clef.

Excerpt taken from 3rd Observation (GCSE), 14th March 2003: Crossways Independent

Karen has written parts for xylophone and drums. She is adding parts to a computer-generated score she prepared at home. She says she will add chords on the piano by hand. I sit in the practice room and watch her trying out different chords. Having worked like this for about ten minutes, she asks me to play the xylophone part on the piano, while she plays the chords, so she can hear what she's written.

During their interviews, I asked Karen and Dionne about their use of music technology having already carried out the observations cited above:

KAREN: I downloaded a demo Sibelius.
VA: Do you use it much?
KAREN: Yeah, but it's a bit annoying because you can't save on it so I don't use it a lot but I have done a few things.
VA: You say you don't use it very much at school. Why?
KAREN: Um, because it's difficult to get in here and there's only a few computers so, and I usually prefer to do other things at lunchtime and after school. It's a bit hectic so it's easier to do it on paper.

(GCSE Girl, Crossways Independent)

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VA: It looks like you don't use the Music Technology much?
DIONNE: 'Cos I don't really use it at school.
VA: You don't?

DIONNE: I've got a demo at home which I use.
VA: So how much time do you spend using it.
DIONNE: Um, only for homework really. About half an hour week.
VA: How do you feel about using Music Technology?
DIONNE: Good but I don't really use the computer that much. I've only just started using the computer really for my work. I've always done it by hand so far.

(GCSE Girl, Crossways Independent)

Several girls from Old Tech Grammar also stated that they were more inclined to use their music technology at home:

NINA: I've got the Sibelius but it's the original version. So I do the bulk of it [composing] at home and then sort of tweak it at school in the lessons.

(A Level girl, Old Tech Grammar)
**

JOANNE: I've had a lot of practice mucking about with it [compositional software] at home and I've got used to how everything works, which is quite useful. I mainly use it for coursework cos I don't have much time to do anything else.
VA: Does that help?
JOANNE: Yeah. If I only used it at school I wouldn't be able to use it as much or get time on the computers so it would hinder me.
VA: Do you prefer to work at home?
JOANNE: Yeah. It's quieter and you can spend, well because it takes a long time to do anything and because the periods are an hour you can't get much done whereas you can work like two hours at home without getting interrupted.

(GCSE Girl, Old Tech Grammar)

However, not all girls who had access to music technology at home were inclined to use it:

GEMMA: Well, I borrowed the Music Time Deluxe Software from school. My parents haven't bought it. My dad loaded it on to my computer for me so that I could do compositions at home but I don't really. I don't really know how to use it that well so unless he says to us like in class 'Do this at home' I won't use it at home because I find it really difficult.

(GCSE Girl, Old Tech Grammar)

Clearly, as I explored in Chapter 3, the issue of having sufficient working knowledge of music software packages is a salient factor in the take up of girls' use of technology and for Gemma, this impacted on how she engaged with it at home. However, for the majority of girls who did make use of it at home, this appeared to be a comfortable space in which to compose and develop their knowledge of the software – a space claimed as their own away from less welcoming masculine spaces.

5.4 Conclusion

The above offers a glimpse into the ways in which girls take an active approach to working with technology in a safe environment where problems are solved in their own time and in their own ways (although it is important to note that this is not the case for *all* girls as some found the technology itself was a barrier to composing which will be discussed in Chapter 6). Within the classroom, it appeared that the girls were often unable to participate in the construction of themselves as technological and I suggested that this was counteracted by their use of music technology in the home. This provided a space that circumvented the powerful masculine-technology relations produced in the classroom, allowing them to negotiate an identity that incorporated technological know-how and gave them ownership of their skills (Henwood et al, 2000). These subjective experiences may not be able to influence the dominant constructions of the classroom but there is a sense that some degree of power and control is being grasped by these young female composers albeit within the home environment which is also marked by forms of social organization.

This theme of 'space' has emerged through my engagement with the data but it is becoming an increasingly important area of research in relation to the uses young people make of ICT in informal spaces. Research into children's home computer use is receiving much more attention (Sefton-Green and Buckingham, 1998;

Facer et al, 2001; Valentine and Holloway, 2001; Facer et al, 2003) but, as yet, not with regard to the specific practice of composition and music software. I have only touched upon it here but believe this could be a fruitful area to explore in order to develop a better understanding of children's compositional processes that links home and school practices.

CHAPTER 6: MUSIC TECHNOLOGY AND THE COMPOSITIONAL PROCESS

6.1 Introduction

Having identified the material and cultural processes and practices that so powerfully contribute to the gendering of the music technology classroom, in this chapter I attempt to provide a cogent picture that illuminates how these practices shape computer-mediated compositional processes and enter into the definition of gendered identities. As I highlighted in the previous chapter, although groups and individuals may attempt to use cyberspaces and new technologies to reposition themselves within these gendered discourses, this can often be quite difficult because of the materiality of gendered social relations of digital spaces. I develop this discussion to examine women's relationship to technology through Haraway's (1990) provocative metaphor of a 'cyborgian' identity which has recently been taken up by several feminist musicologists to conceptualize technological and bodily interactions in musical encounters. This technological coupling supposedly offers the potential to liberate and empower women in all their technological interactions. In light of the arguments I have put forward in Chapters 3-5, I examine what it might mean to be a 'musical cyborg' in the socially produced environment of the gendered classroom through an empirical investigation of boys' and girls' compositional processes, the processes they adopt being circumscribed by the cultural landscape of the classroom. As Shilling asserts:

> Far from transcending the individual material flesh altogether, we can see instead how these technologies remain grounded in, and constrained by, material bodily needs...
>
> (Shilling, 2005: 179)

Music, itself a social text (Shepherd, 1991), has been shown to play an important role in constructing and confirming gender ideologies through hegemonic processes that produce and sustain male dominance (McClary 1991; Citron, 1993; Green, 1997), therefore the coming together of technology and composition compels substantive investigation. I begin by examining the nature of the 'musical stimulus' and the extent to which boys and girls either conform or deviate from stimuli generated from teachers and syllabi. I argue that male students' 'deviance' is accommodated and encouraged by the teachers while female students are not accorded the same degree of autonomy.

6.2 Compositional Stimulus

One of the teachers from New Tech Comprehensive summed up what one imagines many young composers feel at the beginning of a new piece when he stated that 'I certainly feel very frustrated in front of a blank screen or a new Cubase sequencing file and don't know where to start and I think that is difficult'. To counter-act this teachers, guided by music curriculum requirements, invariably provide the initial stimulus for a compositional activity (such as a chord sequence, or type of scale) which means the pupil then has a 'musical idea' on which to base their composition. The teacher is then able to implement the necessary prescriptions of the syllabus, which may also reflect an ideology about the value of certain kinds of music, musical knowledge and medium of composition (Green, 2003) but which may not reflect the values and meanings that the pupils *themselves* construct about their music.

Paynter (2000: 9) is critical of the loose way in which the term 'musical idea' is often employed. He makes a distinction between the composer's *intention* (as in the starting point or stimulus for the musical work) and the *musical idea.* Paynter states that the composer's intention is part of the 'Context'; this context is the pre-musical form which the composer begins to think about the piece and can be based on a musical or non-musical element. It is the starting point and could be

stimulated by a literary idea, a combination of sounds or a musical form such as a fugue or sonata for example but it is not what the music is actually 'about' - 'although it might be described as 'an idea for music' it is not the same as a musical idea!' (ibid: 9). His definition of the 'musical idea' would be the 'musical materials' (such as a melody or motif). Therefore, within Paynter's description the stimulus suggested to the students by the teachers would fall under his heading of the composer's *intention*. However, in light of my respondents' comments, within the classroom the careful distinction Paynter makes between the *intention* and the *musical idea* is somewhat blurred. Because the students musical ideas often proceed from the *teacher's intention* this distinction is less tenable than perhaps it might otherwise be in a situation where the composer herself has control over her compositional intention or stimulus.

Although it is common practice to provide a compositional stimulus, there is some anxiety about this practice amongst music educators. Plummeridge (1981) has long questioned the educational value in giving ideas to children of other composers' work on which they should base their process although it remains an integral part of teaching composition and 'learning by copying has a noble precedent' (Paterson and Odam, 2000:38, in Bunting, 2002b:171). Savage[31] states that classroom composition is a sub-culture conceptualized and practiced in an 'inauthentic' way as distinct from the 'authentic' practices of DJs, classical composers and popular musicians. Even students' familiarity with certain styles, such as popular song genre, leads to an over-prescription of content and formalization of ideas. Glover (2000) also highlights this by arguing that, despite teachers' beliefs that children come into school trying to compose without musical models, children do have a wide range of experiences of musical models acquired through enculturation and it is the teacher's task to uncover what pupils bring with them musically. Enculturation is not about musical training and skill but about children's musical development in relation to their sense of the music

[31] No date is available for this on-line article which appears on the PALATINE website which funds research into the Performing arts: www.lancaster.ac.uk/palantine/jons-article.htm

around them and how they wish their own compositions to relate to this (Sloboda, 1985, cited in Glover, 2000). This leads Glover to assert that '...it is when they [the children] come up with their own ideas for what the music will be that it becomes most meaningful to them' (2000: 27). This is supported by Hickey's (1997) belief that fewer rules lead to a product that is more artistically creative. It may be open to debate as to what constitutes artistic creativity. However, her assertion that 'the more constraints or boundaries delineated in a given problem, the less problem finding and room for divergent thinking is left up to the individual' (ibid:64) is a more straight forward and perhaps less contentious reason for encouraging individuals to work from their own stimulus. Interestingly, the use of providing musical stimuli as an aspect of the compositional process elicited negative comments from virtually all the boys and girls interviewed but the way in which they dealt with incorporating or deviating from the stimulus and the teacher's tolerance of boys' and girls' 'deviance' were markedly different.

6.2.1 Compositional Stimulus, Self- Expression and Ownership

In this section, I will argue that, in addition to the pedagogical arguments just outlined for not providing musical stimuli, giving musical stimuli to students with which to compose has enormous implications for a young composer's sense of musical and gendered identity. If, as Citron (1993) asserts, composition is the main opportunity for women to express themselves we must explore the implications that providing a musical stimulus may have on their sense of musical self. Although some girls stated they liked the boundaries provided by a given stimulus the majority saw such stimuli as removing a sense ownership or pride in their work, as Carolyn passionately stated:

> **CAROLYN:** I find if you're given an idea and told to stick with that idea...then I'm like 'But I didn't want to go in that way', so...You're always proud of yourself when you come away with a composition that sounds sort of good but

then you do sort of, there's not much emotional attachment to the piece. I suppose that's a bit of shame because that's what music's about for me.

(A Level Girl, Crossways Independent)

This sense of 'emotional attachment', pride and self-expression were very strong themes in the girls' comments about their work from all four schools:

VA: I mean, the stuff that you compose. What do you think its purpose is, apart from fulfilling coursework obligations?

JOANNE: Well, I suppose it has got some kind of meaning in it [...] The things you do from scratch or something is more meaningful because it's something you've started from the beginning but if you've got, you're like told to do something along these lines, it's not as meaningful because you've been told like half of what you're supposed to do.

(GCSE Girl, Old Tech Grammar)

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VA: Well, tell me what you like about composing.

LISA: Well, you can use it to express yourself.

(GCSE Girl, Arts College)

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ALICE: It's quite expressive in the way that you can do it, especially as I write sad sounding pieces, but it's kind of expressive and really personal because it's all like your idea and you can feel quite proud of it that you made it up.

(GCSE Girl, New Tech Comprehensive)

**

LAURA: I don't try to be expressive but when people listen to it they're like 'Ah, that's really expressive'. They seem to be able to tell things.

(A Level Girl, New Tech Comprehensive)

On occasion, this personal, self-expressive element could actually be problematic for some girls when their ideas were criticized:

VA: Do you like composing?

KAREN: Yeah. Well, it's a chance to be creative. It can be as personal as you want it to be. I think it's the best part of doing music really.

VA: And do you feel confident with your compositions?

KAREN: Uh, I think I can improve quite a lot. There's definitely room for improvement.

(GCSE Girl, Crossways Independent)

**

VA: What else do you like about thinking up your own ideas?

DIONNE: There's no boundaries. I just like writing music [...] It's just interesting. We can do what we want. Like written work you have to do what the teacher tells you. Composing, we can get our own ideas. It makes you think more.

VA: Do you see composing as anything to do with self expression?

DIONNE: It's a bit personal because it all comes from you. A teacher can't, like if you were writing an essay they tell you what to go on. Composing is all down to you.

VA: How do you feel when people criticize your music?

DIONNE: Criticism is always, it helps. It does feel a bit weird but I learn from it.

(GCSE Girl, Crossways Independent)

**

VA: Would you say you're confident about your compositions?

JOANNE: I think I'm confident about them [hesitates] but I'm, I don't know. I just worry about what other people think about it.

VA: In what way?

JOANNE: Well, if you started something from scratch and you think it's good and someone tells you it's not then it's sort of, don't know, sort of quite nasty. Because if you're doing like a bit of coursework you have guidelines like in other subjects, but if you do this and start it from scratch, so it's all like what you thought.

VA: Why do you think it's more difficult to deal with if somebody criticizes your work then?

JOANNE: It feels like a personal thing when people criticize your music, when they're criticizing about something you've done [...] I might ask somebody else what they think as well and then see if I can improve it from there. 'Cos if somebody else thinks it's bad, the whole thing is bad.

(GCSE Girl, Old Tech Grammar)

**

VA: How do you feel when people criticize what you've written?

NINA: I take it positively because I know I'm not that good and I do need a lot of help so I take it positively and I do change it.

(A Level Girl, Old Tech Grammar)

**

VA: Do you tend to change or stick to your original ideas when people criticize you?

KAREN: Depends on how certain I was about it in the first place. If I was a bit sort of, wasn't quite sure and then they said it was bad then yes, I'd change it. Sometimes my friend Dionne, we tend to play things to each other but we don't really say anything horrible.

(GCSE Girl, Crossways Independent)

On the whole, boys were less inclined to talk of their personal feelings in relation to their compositions and expressed none of the concerns articulated by the girls cited above:

VA: Do you feel your compositions say anything about you? A form of self expression perhaps?

IAN: No.

VA: Absolutely no?

IAN: [Laughs] No.

(GCSE Boy, Crossways Independent)

**

VA: Do you feel your music expresses anything about you?

CRAIG: No.

VA: Does it have any meaning for you?

CRAIG: I dunno about meaningful. It's just whether you like it or not.

(A Level Boy, Old Tech Grammar)

Even if boys do feel that their music has a self-expressive quality, they appear to find it difficult to articulate this, some boys making knowingly trite remarks during their interviews. Luke, from Crossways Independent, was considered by

his teacher and peers to be a highly competent classical guitarist and composer and his music was often performed both in and out of school. During his interview, he would occasionally become very animated when talking about his compositional ideas and appeared to spend a lot of time out of school composing but he seemed unable to commit himself to openly stating that composing was meaningful for him:

> **VA:** Tell me what composing means to you.
> **LUKE:** I think it, um, it expr.. well um, it generally functions, I don't know if I'm ever, um. When I get home from school I'll play [my guitar] for a couple of hours, well not a couple of hours, say for about an hour and then um, not practicing just kind of getting [inaudible]. I dunno composing it um, I think you um, it's important to my life. I dunno I think it's quite nice to see how it affects people, if you play something and it sounds incredible or whatever it changes them, well not changed them but made them, well had some impact on them then that makes me… well, kind of chuffed. I mean um for me I think um it kind of, it's purpose is…um to get a decent grade at GCSE!
>
> *(GCSE Boy, Crossways Independent)*

Having stated that the purpose of composition was just to 'get a decent grade' Luke gave me a 'mocking' smile, cocked his head to one side and laughed. He did not appear to want to continue this discussion about meaning and avoided it by producing a rather banal answer couched in humour.

The only boy who openly expressed that his musical ideas were connected in any way to self-expression was Edward from Old Tech Grammar:

> **VA:** So, do you prefer to have an idea given to you or use your own idea?
> **EDWARD:** Come up with my own.
> **VA:** Why's that?
> **EDWARD:** Um, it just feels more a part of me. Um, yeah, I think it's a way of expressing yourself. It's a nice feeling to know

> you've just created something that sounds nice.
> *(A Level Boy, Old Tech Grammar)*

Certainly, none of the other boys in the study ever suggested that the reason for using their own musical idea was connected to being 'part' of them. Edward's candour and readiness to discuss his music as self-expressive seemed even more of an anomaly as he was a Year 12 student from Old Tech Grammar where a particularly technological masculine identity was valued; a technological masculine identity that carried considerable status for male students and male teachers. Although the standard of playing amongst students at Old Tech Grammar was generally high, Edward was an extremely accomplished player, having Grade 8 in both trumpet and violin (I heard him play the trumpet during a lunch-time jazz band rehearsal). Although he quite enjoyed composing, he saw himself more as a player being a very active member of the school orchestra, jazz group and a member of the local youth orchestra and jazz band. What sets Edward apart is that he showed no interest in developing the highly-prized technological identity sought by the other boys at Old Tech Grammar: he never used the studio and, although I saw him composing at the computer during all of my observations, he never participated in any overt technological interactions with any other students or his teacher. Despite this, he still had considerable status within his peer group who mentioned him as a being 'a really good musician' and as someone who 'could really play the trumpet'. The emphasis on playing traditional instruments in school music has often marked it out as a 'feminine' subject and boys who study school music often reject classical forms. However, those boys who are *expert* in the classical realm are able to transcend the gendering of school music as female, and higher status aspects of school music, such as composing, using computers and being an accomplished instrumentalist are seen as the preserve of males (Green, 1997). I would suggest that, despite Edward's rejection of a digital technological identity, the identity he constructed for himself still marked him out as an 'expert'. Most famous instrumentalists are male and Edward was marked out as a musician with considerable skill, and this enabled him to declare that working with his own

ideas served the purpose of self-expression without fear that this might denote a feminine identity.

Green's study describes similar comments about boys' and girls' relationships to composition which she suggests 'participate in an over-arching discourse on masculinity and femininity' (1997: 215). The former is characterized by 'a confident rational approach to composition based on creativity and genuine attainment through natural talent' while femininity is characterized by a lack of confidence in composition bound up with feelings and self-expression. As the comments made by my female respondents indicate, the personal, expressive aspects of composing are important to their sense of self; an aspect of boys' compositions boys claim they do not feel. Citron (1993: 57-58) is curious as to why women have continued to compose given their lack of confidence and ambivalence towards composition. She speculates that 'composing may function for many female composers as a prime means of self-expression... the main way to channel their inner selves into some tangible form' and this may be different for men who have more outlets for self-expression in Western culture. She goes on to suggest that, for women composers, this may bring the body and mind together 'thereby resisting the negative implications of the mind-body split'. Green (1997), however, suggests girls' references to self-expression and feelings of inadequacy as composers actually participate in the patriarchal definition of femininity precisely because feelings supposedly emanate from the female body and not the masculine, rational mind. When boys refute any connection of feelings with their compositions and present themselves as confident composers, these reinforce the construction of masculinity as cerebral, creatively autonomous and in control of the body.

6.2.2 Deviance and Conformity

Green (1997) has also noted that both boys and girls prefer 'free composition' but the nature of examination syllabi and pedagogical models means that providing an

initial compositional stimulus is common practice. Certainly, all the classroom compositions discussed in this thesis originated from a teacher or from the syllabus requirements. It has been suggested that boys and girls respond differently to set tasks with boys far more likely to deviate from given tasks. This has been interpreted by teachers as indications of boys' 'brilliance' and 'creativity' whereby girls' conformity is viewed as mere 'rule following' and shows their possible lack of real understanding (Clarricoates, 1978; Askew and Ross, 1988). The responses of Green's (1997) music teachers also viewed girls as more likely to stick to the given task, which ultimately led to the perception of them as more traditional and less imaginative. Arnot and Weiner (1987) have suggested that girls are more likely to avoid situations that hold the threat of failure so if 'sticking to the task' is perceived as a prerequisite for 'success' girls are more likely not to deviate from what has been set. Conformity and passivity become part of an expected and acceptable femininity.

Assertive and disruptive behaviour by girls is likely to be viewed negatively with both teachers and pupils tending to be more censorious. It has been observed that when primary schoolgirls tried to subvert traditional forms of femininity teachers labeled them 'real bitches' or 'little cows' suggesting that feminine 'deviance' is framed rather differently to masculine 'deviance' (Lakoff 1975, cited by Reay, 2001). As Walkerdine (1990) observed in her study of gender in the mathematics classroom, boys' bad behaviour is often downplayed by teachers and 'being naughty' is turned into a positive attribute linked to an assumption of masculine creativity whereby boys are seen as 'independent, brilliant, proper thinkers' unlike girls who are 'described as lacking the qualities boys possess. They are no trouble, but then their lack of naughtiness is also a lack of spark, fire and brilliance' (ibid: 127). Green makes a similar observation in relation to music composition:

> ...where feminine conformity is taken to be a symptom of a lack of compositional ability and a dull musical mind, whilst, conversely, masculine non-conformity is understood to be a source of inventiveness and creativity.

(Green, 1997: 200)

It is precisely *because* boys play wrong notes, do not stick to set forms and 'experiment' more that teachers perceive them as having more imagination and compositional ability compared to girls. Girls are perceived as better at 'getting down to work' and tend to work harder but this is given as a causal explanation for their lack of autonomy and creativity (ibid: 198). Girls' qualities (of working hard and being quiet!) are unfavourably compared to the creative and inventive qualities teachers attribute to boys that make them successful at composition. As one teacher commented, girls are more interested in 'writing things down and getting it right' but boys 'would rather be creative & not bother learning how to write/record work' (ibid: 197).

My research findings did not discern a clear-cut gender divide between those who deviate from the task and those who adhere to it; there were examples of both boys and girls adopting this strategy. However, greater numbers girls at New Tech Comprehensive and Old Tech Grammar asserted that they retained the teacher's stimulus compared to girls from Arts College and Crossways Independent who were more likely to assert that they would try to change or adapt the teacher's stimulus. The girls from Old Tech Grammar and New Tech Comprehensive who stated they would try to deviate from the task often referred to this more in respect of making it sound better, were still less likely to discard the stimulus entirely and were more likely to state this was due to lack of confidence in their own ideas:

VA: If you are given an idea, do you feel you have to stick to it?

NINA: I do largely stick to it because I haven't got much confidence to move away, to develop it on my own. I feel confident if I like my idea, if I think it's good structurally and it follows like rules. Yeah, but I do like it, I do prefer to stick to somebody else's idea.

(A Level Girl, Old Tech Grammar)

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VA: Do you prefer starting from an idea that's your own or do you like to have something given to you?

GEMMA: Yeah, an idea which he's given us, the teacher. It's a starting point 'cos if you're told to just compose anything, yeah, it's a lot harder [...] I was given a chord pattern and then composed a melody over the top and I really enjoyed that 'cos I could hear it working and fitting together but when I sort of start completely blank, nothing to go from, I don't enjoy it 'cos I'm not getting anywhere.

(GCSE Girl, Old Tech Grammar)

**

VA: If you've got an idea from the teacher, do you tend to stick to it?

LAURA: I think I stick to it quite a lot. Maybe just change the odd chord I suppose.

(A Level girl, New Tech Comprehensive)

**

VA: Do you prefer starting from you own idea or do you like to have something given to you to get you going?

ALICE: Yeah. An idea which he's given us, the teacher.

VA: Why's that?

ALICE: It's a starting point 'cos if you're told to just compose anything, yeah, it's a lot harder.

(GCSE Girl, New Tech Comprehensive)

In contrast, significant numbers of boys from all four schools were adamant that they would always deviate from the given stimulus whenever possible and exhibited none of the girls' reservations about finding it hard to generate their own ideas. Lawrence, a young guitarist from Arts College with very little formal musical knowledge and limited music reading skills (according to the teacher), stated that he could not work with ideas he did not like and was keen to show that he could control and subvert the task that was set:

LAWRENCE: I can read music all the time, but I don't. I can play the piano but I just don't like it. I just find it a horrible instrument and I can't play something I

don't like or do something I don't like. If I've already got something in my head I can't write [to a given stimulus]. Like I done a composition in school. It was supposed to be a Sonata thing but mine was a rock thing… I made a song up on that. That was pretty good.

VA: But if it was a Sonata…

LAWRENCE: Well, there's no sonata things for guitar… but I could get round it.

(GCSE Boy, Arts College)

However, what is interesting to note is that when boys did comment on the difficulties of working from a given stimulus they were framed within their idea of themselves as being original and free-willed, rather than 'owning up' to their possible theoretical or musical deficiencies as did the girls:

PATRICK: I'd be happier with that [own stimulus] 'cos I'd do what I want to do. It would sound better. Otherwise, I'm doing what he [the teacher] wants to make it sound right. Sir knows what it sounds like but we don't. We can't imagine the piece – what it sounds like.

(GCSE Boy, New Tech Comprehensive)

**

ROBERT: I'm sort of free-willed. I like to do what I want and I can't really seem to do something if I'm just given it.

(GCSE Boy, Old Tech Grammar)

**

STEVEN: I would probably adapt it, change it to fit how I would do it because otherwise it's just inputting someone else's work.

(GCSE Boy, Old Tech Grammar)

Green (1997: 206) observed that boys expressed their negativity towards aspects of composition not in terms of lacking confidence or understanding but as their opposites. One of her respondents, 'Adam', stated that the reason he was not very good at composing was not through lack of ability but due to the fact that he knew so many 'famous tunes' and this specialist knowledge got in the way of his composition. Lawrence makes a similar assertion when he states that the musical

ideas he has already formulated make it difficult for him to compose from an external stimulus just as Robert's inability to work with an idea is connected to his identity as being 'free-willed' and an independent thinker.

6.2.3 Accommodating Deviance

Furthermore, there is evidence to suggest that when boys do deviate from the music stimulus they are more likely to go unchallenged thereby affirming assumptions about boys' supposedly greater creativity and imagination as composers. The teacher's acceptance of their 'deviance' appears to feed back into the boys' perceptions of themselves as creative, musically autonomous individuals and becomes, in Green's (1997) terms, 'affirmatory' of their masculinity. This was certainly borne out in the ways that boys' and girls' deviance was perceived and accommodated by the teachers within the four schools.

Only at Arts College was there strong evidence that girls felt able to be flexible in their approach to the set task and expressed the confidence to do so. Lisa from Arts College was a confident and enthusiastic composer and performer who, when asked if she was interested in composition said

> **LISA:** I love all of that! It's the thought of being able to make up your own type of mood, type of song or something. It's just, I dunno, it just appeals to me a lot. I'm definitely doing A Level music.
>
> *(GCSE Girl, Arts College)*

She openly stated that she would 'get rid' of any ideas that she did not think were good enough. She said that she was happy to incorporate her own ideas with those of the teacher by taking out the 'best bits' suggested by her teacher and re-working them and, from her comments, this approach seemed to be not only accommodated but openly encouraged by her female teacher:

VA: When you've got an idea from your teacher, do you stick to it?

LISA: It depends what type of idea. If it's like a really good idea, I won't like to play it exactly how it is 'cos I wouldn't feel right about that so I'll take the best bits of it and kind of fiddle around with them slightly. It doesn't sound, it sounds slightly like it but it's got a bit of my own touch on to it. But if it's like not a very good idea, if I think it's plain or boring, I'll usually just get rid of it and make up my own [...] She'll [the teacher] give you the ideas if you're stuck or she'll just say 'you could do this, this, this' and she always gives you lots of ideas so you don't just have the one for the whole class to work with.

VA: Right.

LISA: And you've usually got a lot of leeway for you to change them around.

(GCSE Girl, Arts College)

Robert, from Old Tech Grammar, a very confident user of technology (he nominated himself as the technological expert in his class; a role confirmed by several other respondents) asserted that he could not compose if he was given an idea because 'it sort of like pressurizes me. It's like saying you *have* to do this'. His strategy was to completely subvert the nature of the task that was set and, despite some initial misgivings by the teacher, he was allowed to continue to write what he wanted. I will contrast his comments with those of Gemma, another student in Robert's class working on the same task:

VA: Do you stick to that [the stimulus] or do you try to change it?

ROBERT: I have an example of that. He [the teacher] gave me, gave everyone this piece called 'Summertime' and we had to do an arrangement of it and um, mine was not 'Summertime' at all by the end of it. It's now like a sort of a club-dance remix style thing which he didn't like very much. He wanted to hear the actual tune but I'd changed every bit of it: the tune, the rhythm. He tried to make me re-do it but no-one else re-done it so I didn't re-do it.

(GCSE Boy, Old Tech Grammar)

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VA: If you're given a stimulus, do you tend to stick to it?
GEMMA: Yeah, if it was like… well we did I think it was 'Summertime' we had to do a variation on it and that I enjoyed 'cos it was, you had like a bass to go from and you just add bits in and take bits but play around with bits. But I stuck to the general thing, like 'Summertime', some people completely changed it but you weren't supposed to.

(GCSE Girl, Old Tech Grammar)

Whereas Gemma conforms to the given stimlus, by keeping the basic structure the same, because she is 'supposed to', Robert uses the idea of stimulus and the concept of an 'arrangement' very loosely and, even when challenged by the teacher, he refuses to change it. I asked the GCSE Old Tech Grammar teacher about this during his interview. He stated that: 'No, it wasn't what was set and I didn't really like it but Robert is very creative and he tends to produce really good pieces'. The teacher's perception of Robert's deviance (both musically and in terms of attitude, by refusing to acquiesce to the teacher's instruction to re-write his composition) becomes a sign of his creativity and, furthermore, his deviance is tolerated because his music is accorded *value*. As such, 'deviance' and 'value' enter into the discursive construction of masculinity but are not part of the discursive construction of femininity characterized by conformity, diligence and is non-innovatory (Green, 1997).

I will attempt to illustrate this conflation of 'deviance' with musical 'value' by drawing on a detailed example of a similar situation at Crossways Independent in relation to Luke, a Year 10 GCSE student and Carolyn, a Year 12 AS Level student. Initially, it appeared that the level of flexibility in working with the given stimulus exhibited at Arts College was also prevalent at Crossways Independent. Having spent a GCSE lesson reviewing Indonesian scales, the teacher told the students to use the notes of the scales they have just been looking at as a starting point for their own Gamelan compositions and the following exchange then took place:

Excerpt taken from Year 10 class, 28th February 2003, Crossways Independent: Main Music Room

> The teacher says 'I'll let you into a secret, I wasn't sure how much I wanted you to know beforehand' about writing a Gamelan piece. Luke asks does he mean 'not being tied down'. The teacher says he wants them to be 'open to their own inspiration'... Daniel asks about the time signature; he wants to use 19/2 but then says he wants to write it in 19/4. Says he'll try it and the teacher supports this idea and says it will naturally subdivide into smaller blocks.

Afterwards the teacher and I had an informal chat about the lesson in the staff room. He stated that he believed in allowing the students as much freedom as possible and did not insist on them writing 'strict pastiche' of any particular type of music because it was better for students to 'play around and see what happens', as evidenced by his support for Luke's unusual time signature. When I initially began examining this data after my first couple of visits this seemed an extremely positive scenario. However, after carrying out further observations and interviewing the students, I began to realize that what I had witnessed was indeed the teacher's tolerance and accommodation of deviance but that it was generally accorded only to male students.

Upon my first visit to the school, the teacher pointed Luke out as 'an extremely good composer' informing me that both his parents were professional musicians and that Luke was very talented. No claims were made for Carolyn's abilities when I visited my first AS level class (taught by the same teacher) but I found out that she had obtained an A Grade for GCSE music and had achieved an A for her compositions at another school. When asked if he had noticed any differences in the way students composed using music technology, the teacher made a number of comments (see later discussion) but also made the general comment that he tried not to impose too many restrictions during the early stages of their compositions because:

> The fewer rules I give them the quicker they work and also the better they work. I mean, this isn't true of everybody of course. I mean, it's absolutely true of the most gifted…
>
> *(Teacher, Crossways Independent)*

It was noticeable that, when applied to Luke, the 'rules' were exceedingly flexible both in terms of musical parameters and how he occupied his time. He was given a high degree of autonomy in composition classes, often not composing at all. His general 'laziness' in class, although commented upon, was tolerated because he was seen as a 'gifted' composer:

> Luke […] quite likes to be cool and waste his time on Friday afternoons and mess around and then basically produces fantastic pieces, you know […] I wish he would focus more during lesson time but, if he's composing and bringing the work in to show me so it's not so important that he should be actually visibly engaged in work on Friday afternoons.
>
> *(Teacher, Crossways Independent)*

The teacher's attitude towards Luke played a very strong part in Luke's construction of himself as a 'gifted' composer. He was also aware that the teacher's tolerance of his slack attitude on Friday afternoons was connected with this:

VA:	When you do have a brief from the teacher, to what extent do you stick to it?
LUKE:	If I'm doing my own work then I'll stick to it exactly but I don't really, that's the only time I might […] Well unless I do it and change it and then it sounds awful then I'll put it to how it originally was and I'll save it but um normally I'll change it.
VA:	You don't ever feel constrained by the fact that you've been given a melody or a harmony or whatever?
LUKE:	I'm not given a melody or a harmony because I don't know, well I think some people are but I'm not sure I'm expected to stick to it. I dunno.
VA:	What do you mean?

LUKE: Well, I don't think, I mean, um, apparently anyway I'm much further ahead than anyone in the class or the year for music so I dunno, I'm just kind of left to potter about and see what happens really. Yeah, I dunno really. If I find something that sounds really nice the teacher won't make me change it because it's not exactly what he wanted [...] I've also convinced him that playing the guitar during lessons is also a definition of work!
(GCSE Boy, Crossways Independent)

This last sentence refers to what Luke usually does in Friday afternoon lessons and my observations (all carried out during the Friday afternoon double lesson) confirm this.

This contrasts sharply with the teacher's attitude towards Carolyn. Although composition was viewed quite favourably by all students at this school, like Luke, Carolyn was a particularly keen composer often working with her brother's sequencing software at home. Like Luke, she too was trying to forge a strong compositional identity and had very clear ideas about the music she wanted to write. However, unlike Luke, Carolyn was not viewed as a particularly gifted composer by the teacher and he would often become frustrated with what he saw as her 'inability to move ideas forward'.

CAROLYN: Yeah, um...I'd say I'm really satisfied with the Minimalist style but I feel a bit, with the song I wrote that it's sort of.... Not to be rude about the teacher but I sort of felt it went off in the direction that he wanted it to go in and not so much in the direction that I wanted it to go in. And I felt it's sort of come away slightly sounding like popular music mixed with a Renaissance dance which sounds slightly bizarre. I still like it but it's just I don't feel that it was really what I wanted to write.
VA: How did that happen?
CAROLYN: I think it was just because, I've got to do a middle 8 section of the composition and I think he was trying to show me how to do this by doing this composition with me and I think it sort of... he had to kind of show me how to do certain things...it meant that it went in a

> different direction. Um, I started with a very good idea for the song but then I hit a hard...wall sort of thing. I hit a barrier and it's quite hard for me to get over that and that was the point at which the teacher's influence on the piece came in because he was getting quite frustrated that I wasn't getting on with this piece and I was finding it quite difficult getting on with the piece so he just went 'Well, do this, do that, think about the instruments coming in there' and giving me these ideas and I just went with them because I couldn't think of anything else to do. Um and I think that meant that it came out sort of with quite a lot of his ideas.
>
> *(A Level Girl, Crossways Independent)*

Carolyn, despite her best efforts, was not afforded an autonomous compositional identity, unlike Luke. The assumption of her lack, exacerbated by the teacher's significant compositional input into her piece, appeared to prevent Carolyn from developing and showing her skills as a composer. Although the teacher stated that he was in favour of giving his students compositional autonomy, this was contradicted by his comments about two female GCSE students as being quite malleable in their compositional ideas:

> Yes and not only that, they will, once a finished object appears like it did six weeks ago and was not yet ready, they will allow themselves to be persuaded and take it back and reconsider it and in fact, the finished items, the reconsidered items are very, very good. In every way, there is no way you can fault them.
>
> *(Teacher, Crossways Independent)*

When talking about the boys in this GCSE class, the teacher allowed them considerable latitude for initiating and developing their ideas. Although the teacher acknowledged that Nicholas and Ian were 'not quite there yet' compositionally he stated that:

> For Nicholas, I just have to wait for it to click in and I know that he will because I think he's a very bright chap [...] Ian suddenly switched on and really wanted to do this thing so I'm letting him do it on his own, to find out what he can do...

(Teacher, Crossways Independent)

Their perceived intelligence (in contrast to their actual abilities) affords them time and autonomy. The teacher's perception of the girls, on the other hand, was of requiring greater levels of intervention although both Nicholas and Ian, who were 'not quite there yet' compositionally were allowed to find things out for themselves and work at their own pace (even if this involved doing virtually nothing in class, as was the case with Luke). Due to the teacher's perception of Carolyn as unable to develop ideas and not being a particularly gifted composer, he appeared to assume that she required more help in developing her ideas to the extent that she no longer perceived the composition as her own conception.

During his interview, Luke asserted that he was not composing in school because he had a 'creative block'. He was playing around with a chord sequence at home for a 'much bigger piece than anything I've really tried to do before' that would be scored for guitar, double bass, string quartet and percussion. The teacher also commented on Luke's intention to write an 'ambitious' piece and was happy to let him work this out in his own time. Citron asserts that the music education required to become a composer reflects ideologies about the kinds of training needed to produce certain kinds of music; the type of music that embodies the value of the musical canon and has tended to privilege 'largeness: more notes, more sound sources, more performers, more volume' (1993: 60). These large-scale works also require greater understanding of the technical knowledge of harmony and orchestration and they have historically been prohibitive for women composers as the most common outlet for female composers has been the least technical and technologically demanding types of composition, such as for the solo voice (Green, 1997: 93). Luke's ambitions to write a 'big' piece appears to reflect this privileging of male knowledge, supported by the implicit value judgement from the teacher that underpins his relaxed attitude towards Luke's classroom activities.

The teacher's attitude towards Luke invokes Battersby's (1989) description of the male creative 'genius' of the nineteenth century who embodies the values of originality, authenticity and spontaneity. But, as she points out (ibid: 15), this is an evaluative term whereby the 'genius' is judged valuable in terms of his contribution to art and culture and these will be *male* standards on which judgements are made. These judgements also accord with the notion of 'professionalism' which comes with a number of assumptions about the identity of the composer, that the professional composer will be male (Citron, 1993). As Citron (ibid) asserts, the composer is the presumed repository of knowledge and skill, which requires cerebral control and 'is implicit in the notion of composition, and which is definitively masculine in its connotations (Green, 1997: 216). The above discussion demonstrates how the material structures of the classroom control and circumscribe an important aspect of the compositional process and the different implications this produces for male and female composers and the production of musical ability. Commenting on what Luke does (or does not do) on Friday afternoons, his teacher asserted that:

> As long as he's here and kind of thinking about it and vaguely thinking about what everyone else is talking about then actually, well for an adult we would allow that to be a vital part of the process so why on earth should that not be for a fifteen year old.
> *(Teacher, Crossways Independent)*

Like Luke, Carolyn also said that 'I generally have to sit down and think about what I'm gonna do' to work on new ideas but the teacher saw her as 'always leaving things to the last minute'. Although both Carolyn and Luke appear to work best when starting from their own ideas and both needing time for ideas to develop, Luke is granted the privileges of an adult/male professional composer because he produces 'fantastic pieces'. However, Carolyn, whose compositions the teacher does not consider particularly noteworthy, is not accorded the same status and this has serious consequences for her identity as a composer as her final comment illustrates:

> **CAROLYN:** I found with my song, because that was setting a poem to music, putting it into a song and I went away and spent a lot of time thinking about the poem that I was going to put in and the main melody and how that was going to reflect the poem and the feelings I felt came from that poem and that sort of, I wouldn't say it got lost but it's not clear now, so I think that's quite disappointing. There's not really a lot I can do about it.
>
> *(A Level Girl, Crossways Independent)*

These illustrations echo the observations made by Walkerdine (1990) and Green (1997) as outlined earlier, suggesting that boys' deviance is viewed positively as a sign of independence and creativity. As Citron (1993: 45) observes, 'patriarchal society has captured the concept of creativity and deployed it as a powerful means of silencing women'. Carolyn has certainly been silenced: her 'very good idea' transmuted into something that was not hers - neither she nor her ideas appear to be valued. It may well be that some girls are more willing to rely on the guidance of the teacher due to a lack of confidence in their abilities (Green, 1997). This lack of confidence is not innate but becomes part of a musical feminine identity that reflects back, negatively, onto these young female composers.

I will now turn to the next stage of the compositional process where ideas are worked out and developed in a computer-mediated environment and will contextualise this discussion by examining how women's digital interactions are conceptualized within current feminist theory.

6.3 Theorizing Women's Digital Interactions

The 'cyborg' image has become increasingly prevalent in feminist discussions about women and digital technologies, including music technologies, and it has proved hugely influential in contemporary cultural theory and therefore, in a thesis of this nature, requires some discussion. Discussions that draw upon the 'cyber' images often appear to adopt an uncritical and unproblematic approach to

women's engagements with technology, often hailing all such engagements as empowering and liberating. Unfortunately, the metaphoric cyborg can obscure the material social structures that work against the very empowerment that feminists claim technology enables. This is particularly relevant given the concerns underpinning this thesis which, as outlined in Chapter 2, questions and explores what I believe to be determinist claims made for the 'liberating' and 'democratic' potentialities of engaging with computer technologies as Bennett's comments starkly illustrate:

> Many difficulties that girls face in classrooms can be addressed more easily by learning through computers than by any other means. Girls will have for the first time, equal opportunities in all basic learning... Traditionalists might object that girls will feel uncomfortable with computers. That is a foolish objection... Neither girls nor boys will be intimidated by computers.
>
> (Bennett, 1999)

This appears to assume that the 'difficulties' faced by girls are somehow innate and that the computer is the best means to alleviate these difficulties (however defined). Nevertheless, like many determinist discourses, it fails to account for the social context in which learning takes place, the classroom and the computer are both socially constructed spaces in which gendered social relations are played out. The discourses of educational computing attempt to tell the 'true stories' of how and why new technologies are harnessed, stories that focus on technology's 'impacts' and its innate ability to effect change and improvement. However, as I have argued, this is a very partial view, which renders the social aspects of technological use invisible, and the interpretive constraints imposed on these stories 'differently construct possibilities for pedagogic relations amongst students, teachers and educational technologies' (Bryson and De Castell, 1998: 199). Not only pedagogic relations but gendered social relations too. These 'stories', in turn, become a species of meta-narrative that informs and is informed by accounts

of computer use in the classroom. Bryson and De Castell are critical of the idea of technology as ultimately transformative - that technology can act as a catalyst for reconfiguring relations between children, tasks and teachers in educational contexts. Why should a computer, itself socially constructed, be able to reconfigure these relations especially if, as Turkle (1984) argues, they are constructed as male domains? As I have maintained throughout this thesis, computers and digital technologies are as likely to reproduce and reinforce existing gendered social relations as challenge them.

The 'cyborg' (Haraway, 1990) is a cybernetic organism representing a hybrid of machines and organisms that blurs the boundaries between human and non-human and becomes a 'disassembled...reassembled, postmodern collective and personal self [which] feminists must code' (ibid: 205); 'a creature of social reality as well as a creature of fiction' (ibid: 191). As a rhetorical device, it has become almost a feminist icon (to some) with its utopian vision of a gender-free future in which women are positioned as being unimpeded in their participation in the construction of new meanings in the world of technology. Therefore, as a potentially reconstructed identity, that supposedly transcends cultural assumptions about males and females, can representations of this 'new' cyborgian identity reconfigure gendered social relations in technological spaces? Despite assertions that cyborgs transgress old gender boundaries, perhaps they may only serve to set new boundaries, which may themselves turn out to be as restrictive and confining as the old ones. In fact, is it not re-running the Cartesian version of identity, one that privileges the mind over the body in a cyborg configuration that ultimately embraces disembodiment?

Theorizing the female body and its technological fusions - whether materially constituted, sonic fembot or metaphoric cyborg – remains a critical concern for feminist theory. Grosz (1993) suggests that the crisis in conceptions of knowledge and knowledge production has resulted from the historical privileging of the mental over the corporeal. The knower has been conceptualized as

disembodied and this knower is male. She states that men have taken on the role of neutral knowers and thinkers because they have 'evacuated their own specific forms of corporeality and repressed all traces of their *sexual* specificity from the knowledges they produce' (ibid: 204). She further argues that we cannot ignore this explicit sexualisation of knowledges asserting there is a distinct relationship that models of knowledge have to sexually specific (male) bodies. She rejects the notion of the male body as the main site of knowledge production and attempts to reclaim the female body, arguing it is this specificity that provides a site of possible resistance. Grosz wants to develop the female body as the *subject* of knowledge that will reveal the phallocentric and partial nature of dominant knowledges as well as creating new ways of knowing. Rather than attempting to either omit the body or even transcend it, Grosz wants to put the body first, right at the centre of subjectivity. It is not enough for women to be involved in gaining access to knowledge but they must help in creating that knowledge, making their own meanings (Green et al, 1993). Adam (1998), in her discussion of the body in Artificial Intelligence, makes similar observations. She notes that in the artificial world of cyberspace, where the mind is down-loaded into a robot, there is an assumption that the body can be left behind. She suggests that much of cyberspace's appeal for men is through these masculine attempts to transcend and escape 'the meat' (the body). By questioning the superiority of the archetypal knower, a universal male subject, and insisting that we look for meanings in terms of embodiment via real bodies in the real world, feminists will be able to challenge the 'stereotypical mould', providing the possibility for a different type of knower. However, as Francis observes, 'constructions of self clearly depend on other people as well as ourselves…so the self incorporates both contradiction and consistency, and is constructed by ourselves and by others' (2001: 71). It is this contradiction and tension between Haraway's cyborg as a disembodied, socially unencumbered construct and the corporeal embodied subject in the production of knowledge that seems to be the stumbling block to political engagement.

Cultural representations of cyborgian identities often retain the 'essences' of the dual nature of the human-machine hybrid. Although the cyborg is predominantly understood as a machine (it is programmed, does not show emotion), it must retain elements of its 'human-ness' and with it other physically and culturally inscribed markers of sex and gender which cyber-bodies in popular culture often exaggerate (Springer, 1999). These cultural associations cannot be eclipsed or effaced but end up merely reproducing extreme constructions of masculinity and femininity. For example, the ultimate cyborg as exemplified in the film 'The Terminator' (James Cameron, 1984) is presented as a male body, barely human but very obviously male with its sculpted muscles and imposing physical size. Springer notes that, even though the male body has been replaced with electronic parts and as such has been deconstructed, this reconfigured technological masculinity does not disrupt existing gendered hierarchies:

> In a world without human bodies...technological things will be gendered and there will still be a patriarchal hierarchy. What this reconfiguration of masculinity indicates is that patriarchy is more willing to dispense with human life than with male superiority.
>
> (Springer, 1999: 48-49)

Female-gendered cyborgs also inhabit traditional feminine roles and are endowed with stereotypically feminine traits. Balsamo (1999) cites the female cyborg 'Rachel' in the film 'Bladerunner' (Ridley Scott, 1982) as an example: she inhabits a sexually inscribed body that is the object of the male human Deckard's sexual desire and, as such 'symbolically reasserts the social and political position of woman as object of man's consumption' (Balsamo, 1999: 148).

Despite this stereotyped image, Balsamo suggests that female cyborg images are more able to challenge the opposition between humans and machines because 'femininity is less compatible with technology than is masculinity...because our cultural imagination aligns masculinity and rationality with technology and science, male gendered cyborgs fail to radically challenge the distinction between

human and machine' (ibid: 149). Despite her assertion that the cultural contradictions embodied in the female cyborg strain the technological imagination, I would suggest that these cultural contradictions are less easy to read than she believes – the dominant reading when we look at the female cyborg is her 'essential' femininity, sexuality and objectification. More often than not, this is the most noticeable thing about her and we read her as an essentialized biological woman.

For example, it seems that the image of 'Lara Croft', a computer-generated super-heroine in the popular Tomb Raider game, might be interpreted as an attempt to present an empowered female identity (physically strong, aggressive, fearless). However, her bodily image, with its small waist, long slim legs and large breasts, merely grounds Lara in an idealized feminine identity that instantly marks her out as female carrying with it all the cultural baggage that goes with such an eroticised and sexualised representation. Wajcman (2004) notes that the game features a 'Nude Raider' patch that removes Lara's clothing and this makes it difficult to conceive of Lara as a feminist heroine. The cyborg body is no more likely to be free of social constraints than the corporeal body; traditional gendered roles are rarely challenged in visual representations of cyborgs (Gonzalez, 2000). The cyborg is as much of a construct as 'woman' and one must therefore ask if a reconstructed body can really guarantee a reconstructed cultural identity. Balsamo suggests that the cyborg image merely reproduces limiting not liberating stereotypes of gender and sexuality – the most dominant representations of cyborgs 'reinserts us into dominant ideology by reaffirming bourgeois notions of human, machine and femininity' (1999: 154).

But how does this human-machine identity play itself out in lived social relations when it seems so difficult to conceive of our selves and bodies in this way? The crux of this argument takes up a position that sees a cyborgian subjectivity as potentially transformative, but in what ways? Balsamo's (1999) reading of the

cyborg is helpful in this regard in her conception of it as a symbol for interpreting how the new and the old can work together (old/new technologies; old/new identities). Balsamo envisages the assemblage of woman as a cyborg from parts of women's *experiences* that can be reassembled in such a way that seeks to ground the female cyborg in a material sense and it is this that will support a critical perspective of techno-scientific discourse. Battersby (1999) argues that what the cyborg enables us to do is look at how female identity can be conceptualised in terms of a *different* understanding of boundaries, a revisioning of the female sense. This is significant if we acknowledge that the redrawing of boundaries of the self is a political process and how they are drawn depends on who sets the agenda. As Squires asserts 'we cannot assume that the current cybernetic developments will not also result in ontologies that, although redrawn, are nonetheless highly gendered' (2000: 362).

6.3.1 Digitally Mediated Processes

So, what does it actually mean to 'be' a cyborg and to claim it as an aspect of our embodiment for women in general and for women in the realm of music? What forms of human-machine musical amalgams can actually challenge masculinity's association with culture and technology and what does this mean for girls in the technologized music classroom? As I have indicated above, it is to the *materiality* of these human-machine amalgams that we must turn in order to unearth the power relations that underpin these technological unions and herein lies the rub. As Cockburn (1999b: 181) observes 'the appropriation of...tools and machinery by men is an important source of women's subordination, indeed it is part of the process by which females are constituted as women'. Therefore, unless women themselves have the power to decide upon the nature of these technological unions, applying a cyborgian epithet does nothing to disrupt or dismantle men's material control of music technology and women's bodies within music.

My analysis in previous chapters has demonstrated how the processes that produced gendered expectations in the classroom were powerfully aligned with masculine notions of skill and expertise, both materially and symbolically. As I demonstrated, the concept of technological mastery and control – characteristics culturally constructed as male - are intrinsic to a style of composing at New Tech Comprehensive and Old Tech Grammar and this has significant implications for female composers. This type of compositional environment seemed to favour those pupils who always worked directly onto the computer from the very beginning of the process and, when given the choice, these were usually boys. As such, a technological focus supports boys' preferred ways of working more than girls'. Opportunities for working acoustically were not encouraged, nor was it *physically* possible at Old Tech Grammar because the designated space for composition was in the music technology suite where all students were expected to work at individual computers connected to a keyboard.

I would suggest that although students are expected to be in control of the technology, they are not in control of the process; a process circumscribed by the gendered meanings constructed around technology. These gendered meanings appear to work in favour of the perceived interests and styles of working associated with males. This can be especially problematic for girls who find the technology itself a barrier to composing:

JOANNE: I do occasionally, although not so much any more 'cos all this technology has really put me off composing.
(GCSE Girl, Old Tech Grammar)

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NINA: I tend to compose on the piano because you muck about with it more, you can manipulate it more but then the problem is transferring it on to the computer. You've got to find a rhythm and all that and I do find it easier but it's hard to make it sound like it on the computer because of, yeah, the different rhythms… Using technology's a whole lot harder and I'm struggling.
(A Level Girl, Old Tech Grammar)

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GEMMA: I find composing difficult anyway. Then with the computer I find it impossible...with the computer you have to put it in and then you think it doesn't sound right but you can't work out what sounds wrong...'cos whenever we're composing we're expected to do it straight on to the computer. I mean we've never sat in there [main music room with keyboards and headphones] and been told to compose. We're always told to go into the ICT room and compose on to the computers...With the piano, you can just kind of sit there and play something and keep altering it but with the computer you have to put it in and then you think it doesn't sound right but you can't work out what sounds wrong and you don't know how to change it.

(GCSE Girl, Old Tech Grammar)

Boys rarely expressed similar anxieties and were more inclined to state that they used the computer throughout each stage of the compositional process, from the first idea through its developmental stages, where the equipment is used as an interactive medium throughout and is integral to the process (Folkestad, 1998). Turkle and Papert (1990) maintain that one of the reasons girls stay away from computers is because they come to symbolize an alien way of thinking, contributing to the construction of a computer culture that stresses domination, control and mastery – characteristics normally attributed to males but not females. These characteristics play no part in the construction of patriarchal definitions of femininity and girls who are compelled to compose within this culture may experience a conflict between their preferred style of working and their identity. Turkle (1984) has called this controlled, structured way of working with computers 'hard mastery'; although there is a degree of flexibility to 'getting it right', ultimately the goal is always to get the program to realize the programmer's plan. Computational elements, abstract entities and the controlled use of the computer allow few possibilities for chance happenings. She asserts that the 'hard' mastery style, concerned with formal, planned thinking, is given privileged status and is a style often associated with males and many computer-assisted learning sites. These plan-oriented, abstract thinkers 'not only share a

style but constitute an epistemological elite' (Turkle and Papert, 1990):

VA: Do you ever compose away from the computer?

NICHOLAS: No. I just do everything on computer really. I just find it much easier. I put ideas on computer first and then, if it sounds wrong then I'll change it.

(GCSE Boy, Crossways Independent)

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VA: So do you put things straight into the computer?

EDWARD: I find it a lot easier on computer 'cos if you make a mistake doing it by hand you've got to do it again.

VA: When you're told to do composition where does that take place?

EDWARD: Well, when we do composition we're in the music tech room.

VA: Are you happy with that?

EDWARD: Yeah. That's where I work best.

(A Level Boy, Old Tech Grammar)

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STEVEN: I do that on computer. I just mess about with, put something in and then slowly do the other parts.

(GCSE Boy, Old Tech Grammar)

Only one female pupil stated that, given the choice, she would still go to the computer first when working on a composition. This was the same (and only) girl I had observed working at a computer during my visits to New Tech Comprehensive:

VA: Tell me about any particular likes or dislikes with respect to Music Technology.

ALICE: About using the computers, I think it's quite good how you can like play something in and then it'll write it down [...] It's easier to work with computers because they have like many different tracks and things. Normally I write a piece and go to the computer straight away to start it.

VA: Does that mean you have ideas before you go to the computer or do you go there completely cold?

ALICE: Go there completely cold. If I'm stuck I'll go to the

computer and try and start it.

(GCSE Girl, New Tech Comprehensive)

Many girls stated that they did not like having to use the computer during the initial stages of working through ideas. Although they liked the practical benefits it afforded such as immediate playback, unlike Alice, they reported finding it difficult working directly onto the computer while trying out initial musical ideas:

KAREN: I think it's better to use the computer when you've come up with the basic melody or whatever and then you can elaborate on it but to come up with original ideas it's easier for me to come up with something on the piano.

(GCSE Girl, Crossways Independent)

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LAURA: It's good because you can actually hear what you're thinking straight away. You get to hear exactly how you want it instead of the way you sort of play it on the keyboard.

VA: Did you put the ideas straight into the computer at the very beginning?

LAURA: No. I don't think I'd've got very far doing that.

VA: Why's that?

LAURA: I don't know. It's just easier at the keyboard. You can play what you want and when you're at the computer you have to have a bit of an idea to start with. It was just like a first little thought then it's as easy to write it down and then I can think about it a bit more and *then* go to the computer.

(A Level Girl, New Tech Comprehensive)

To highlight how these dominant discourses influence the compositional process I will describe an A level composition class at Old Tech Grammar in which Miss Prime was teaching. She spent a considerable amount of time with Louise, working with her at the computer. Louise was writing a vocal piece for several voices and the teacher asked her to talk through how the voices were working in harmony. This conversation went on for some time and Louise began to point out

problems with the layout saying that things kept 'shifting' and she was having difficulties lining up the parts which was slowing her down. After the lesson, I asked the teacher about Louise and was told this was the first time she had ever used the computer for composition and she was finding it quite difficult. I asked why she had chosen to use it now and was told that she *had to* because it was for her AS coursework. I asked if coursework had to be submitted in this format (knowing that there is actually no such stipulation in the syllabus) and the teacher said that was how their pupils were expected to do it and 'anyway, it's easier to compose like that'. She also thought it reflected positively on the school because scores looked more professional: 'it's not good enough to hand-write stuff nowadays'. Looking at Louise's questionnaire I noticed that she had Grade 7 with distinction in both piano and violin so one would assume that she could have composed, given her level of musical knowledge, in a non-digital format in a way that she may have felt more comfortable with. Unfortunately, she was off sick on the days I carried out the interviews and was not able to follow this up with her.

This digitally-driven approach to composition appears to support Caputo's (1994) assertion that digital forms of knowledge are more highly valued, an ideology that positions those without this knowledge as inferior. Particular kinds of electroacoustic equipment may encourage particular ways of working, based partly on the symbolic language used, the interfaces connected, the shape and feel of the instrument and the assumptions programmed in (McCartney, 1995b). Savage and Challis (2002: 14) suggest that technology is an aid to experimentation; learning through playing around, employing an almost 'accidental approach' which facilitates a necessary sense of play and experimentation with technology. Colley et al (1997) suggest that girls were more likely to use the computer as a 'tool' whereas boys would use it as an end in itself. They suggest this could be a manifestation of a style of working with computers that corresponds to their use of it in out of school situations, such as playing with games software. For example, Suss et al (2001) found little difference between the amount of time boys and girls spent playing video games,

but they noticed that boys tended to talk about them more and with more enthusiasm with their friends than girls. As I demonstrated in Chapter 3, this 'accidental approach' resembles the types of engagement that boys are more likely to engage with and consequently, this style of working may be more conducive to larger numbers of boys than girls.

6.3.1.1 Creativity versus Technical Mastery

Music students are now involved in 'gaining control' of sound via acquiring the skills to manipulate it but this produces a shift away from musical creativity to the notion of control and technical mastery (Caputo, 1994). In my study, the boys never commented upon these aspects of engaging with music technology negatively but it was a cause for concern for several of the girls. Where technology remained central to the compositional process, many girls commented that the musical aspects of their work were hindered because they had to focus solely on the technical aspects of the process. Boys were less likely to express any sense of interruption in their process particularly at New Tech Comprehensive, Old Tech Grammar and Arts College where the construction of a masculine technological discourse was most overt and where the acquisition of associated skills was a strong theme in the construction of an acceptable masculine identity. Although the girls cited below made positive comments about the practical aspects of the computer they were cautious about what it could help them achieve musically:

LAURA: I think, when you're using the computer you don't think quite so musically. It's more sort of technical than the actual musical aspects of it.

(A Level Girl, New Tech Comprehensive)

**

VA: Do you think that Music Technology is generally a good thing for you?

LAURA: It helps me carry on but not to start with. I don't think it should be used for everything. You've got to have thoughts and stuff first of all and then use it.

(A Level Girl, New Tech Comprehensive)

**

VA: What do you like or dislike about technology?

LISA: I like that fact that you can play more things on computer, but there's parts of it like, 'cos I'm a piano player I can't pedal on the keyboard. It's certain things you can't do. It's a bit unmusical.

(GCSE Girl, Arts College)

**

NINA: Yeah, I do tend to improvise, cos I do jazz piano and that helps a lot.

VA: Do you think you could talk me through what you think are the good and bad points about Music Tech.

NINA: Um, well it does get in the way of what you want to do musically 'cos it's one thing playing it all out on the piano and it's another thing transferring it on to the score and making it sound like… you'd probably have to simplify it a lot more because it's just too complicated to put in.

(A Level Girl, Old Tech Grammar)

***

CAROLYN: Positive aspects is it saves you having to write everything out lots and lots of times…Drawbacks is the, it took me a few weeks to get used to it and I think that sort of took time away from when I could have been getting ahead with the composition generally. There are times when I find it quite frustrating because, it's like little things. If you have to spend five extra minutes trying to get the note to move you get wound up by it but…maybe that's probably just me using it [laughs]. Possibly I'm not quite as good as I thought! I don't know… I found it hard to begin with because I found it stifled the whole creative process behind composition just because I had to learn how to use it and I had to learn how to use it to the best of my ability but while trying to compose at the same time.

(A Level Girl, Crossways Independent)

These girls associate the computer's compositional role with the 'technical' rather than 'musical' aspects of their work reflecting Caputo's (1994: 89) concern that this has gendered implications - and huge educational implications regardless of gender - because knowledge that cannot be communicated in digital form might be devalued: technology emphasizes digital knowledge at the expense of experiential knowledge. As girls are socialized to pursue relational, analogic ways of knowing, they must unlearn these ways in order to be successful with technology therefore 'girls are set up for failure on some level as they confront technology and are measured by a male norm' (ibid: 89).

6.3.2 Redefining and Re-evaluating Women's Engagement with Music Technology

My arguments outlined above are not meant to suggest that girls cannot use technology but describes an antipathy for particular types of interactive engagement in a digital-mediated environment over which they have little control. In fact, within Old Tech Grammar it could be argued that all possibility for personal agency was removed. As I have argued, this is central to the ways girls and women are normally positioned in relation to technology where the possibilities for taking control and exhibiting technical skill is made difficult, if not impossible, within masculinist technology cultures. In this section, I draw on the work of a number of feminist musicologists who have put forward arguments for women's empowerment via the image of the 'musical cyborg' in which women supposedly do have technological control.

For some feminist theorists, the *symbolism* of the supposed female musical cyborg at the level of representation is of considerable significance (Dickinson, 2001). While Davis (1997) believes cyborgs may offer new ways of thinking about women in the digital domain, she draws our attention to the fact that this can lead to an abstraction of the body from concrete social contexts that lead to a

disjuncture between the symbolic and the material:

> While there has been a wealth of feminism scholarship devoted to exploring the particularities of embodiment, recent feminist theory on the body has displayed a marked ambivalence towards the material body and a tendency to privilege the body as metaphor...[B]odies are not simply abstractions, however, but are embedded in the immediacies of everyday, lived experience. Embodied theory requires interaction between theories of the body and analyses of the particularities of embodied experiences and practices. It needs to explicitly tackle the relationship between the symbolic and the material, between representations of the body and embodiment as experience or social practice in concrete social, cultural and historical contexts.
>
> (Davis, 1997: 15)

The problem Davis has acknowledged is particularly pertinent given that cyber theories about female bodies, identity and technology seem less concerned with dismantling the *mechanisms* through which women are discouraged from engaging with technology than the *symbolic* meanings associated with female cyborgs. As Davis observes, by divorcing the symbolic from the material so sharply and not addressing the concrete social spaces between the two, it will be difficult to develop embodied theories of the body that challenge patriarchal systems.

I would suggest that the work of Dickinson (2001), in her discussion of Cher's chart-topping single 'Believe' (1998), is a powerful example of the problems of privileging the symbolic over the material. The focus of Dickinson's article

revolves around the use of a piece of digital technology called a Vocoder[32] which is used during the chorus of the song. The vocoder became widely used in the 1970s when synthesized music was very popular, and is especially associated with the work of the German band Kraftwerk. Examples of its use can also be found in a wide range of popular music at that time from Electric Light Orchestra's 'Mr Blue Sky' (1977), Pink Floyd's 'Animals' (1977), Laurie Anderson's 'O Superman' (1981) to The Buggle's 'Video Killed the Radio Star' (1979). Since Cher's success with 'Believe', the vocoder effect can be detected in the songs of a number of female artists including Madonna, Christina Aguilera, Faith Hill and Kylie Minogue.

Dickinson (2001) argues that the recent appropriation of the vocoder by female popular music artists may create potentially empowering new meanings for this piece of music technology helping us rethink the role of recording technologies in the construction of female musical corporeality. Drawing on Green's (1997) assertion that, for female singers, the body is their instrument, Dickinson observes that the involvement of the body is ever-present in popular music and discourse but the 'naturalism' of the female singing voice is impaired and confuses the listener as to its origin when heard through a vocoder. She states that 'music technologies...also moonlight as systems of both control and empowerment' (ibid: 337), and the vocoder is now more readily conjoined with the feminised voice and thus offers the 'cyber-potential' of an empowered digitalised female identity.

But surely, to argue for any form of 'empowerment' we must be absolutely clear *with whom the power lies to make these musical decisions*? As noted earlier, Balsamo (1999) stresses that a cyborgian subjectivity can only achieve material transformation when grounded in women's actual experiences. If these

[32] There are two kinds of Vocoder. The first modifies the pitch and is useful for pitch corrections, the second uses the input signal to modify a given carrier signal producing a robotic-sounding voice. The piece of equipment used on 'Believe' was Digitech's 'Talker' which produced the first type of effect.

experiences are controlled and manipulated by men, is it really possible to argue, as Dickinson attempts to do, that the mere use of a technology is empowering? Perhaps it is possible to make this assertion if we draw on Balsamo's (1999) observation that female gendered cyborgs (in this case, Cher) are better able to challenge existing technological discourses because we do not normally associate femininity and women with technology. However, I think this is still rather tenuous. Dickinson (2001) acknowledges that music technologies are also systems of control but she appears reluctant to engage with this aspect of material subjectivity. Dickinson does begin to acknowledge this dilemma when she describes the process that the male producer, Mark Taylor, went through to achieve the desired effect noting that the 'male production and responsibility are a glaring issue' (ibid: 343). Given this caveat, she still sees fit to assert that the incorporation of the vocoder in women's vocal performances

> ...attributes mastery to a woman, even if she was not part of that particular production process...Even if the vocal manoeuvre was not negotiated by 'the real Cher', she does become a metaphor for what women could possibly achieve with more prestigious forms of technology...A vocoder intervenes at an unavoidable level of *musical* expression...encouraging the listen to think of these women as professionals within music practice.
>
> (Dickinson, 2001: 341).

I would argue that, rather than being an active part and a challenge to these existing practices, the material, embodied Cher appears to have been subsumed within a system of musical production which is man-made and male-controlled; a situation women in popular music often find themselves in:

> Women in pop and rock are isolated and objectified, decontextualised from the social relations often believed to be women's forte. In order to be

> 'successful' in a male-dominated society, they must package themselves (or be packaged, as in advertising image) as objects amenable to control by men.
>
> (Shepherd, 1991: 156)

It is important to be clear about the level of intentionality before making claims for Cher's 'empowerment': 'the person engaging in resistant acts must do so consciously and be able to relate that consciousness and intent' (LeBlanc, 1999 cited by Piano, 2003). Dickinson quotes from an interview by Mark Taylor (one of the producers) at length about the process but omits a crucial aspect of his narrative (from the same interview) in which Taylor is reported as saying:

> It was a bit radical...Basically, it was the total destruction of her voice, so I was really nervous about playing it to her.[33]

Cher's disembodied voice now becomes the raw material for Taylor's technological manipulations. Dickinson is very much aware that her argument might be challenged on these grounds at one point asking if, as 'Believe' is produced by two men, this will undermine the power she ascribes to 'vocoded female articulacy?' (ibid: 342). However, she sidesteps this issue rather unsatisfactorily by asserting that, as female vocalists are often 'featured' within dance music often in supporting roles (Bradby, 1993), the fact that the *female* Cher is established at the helm is sufficient warrant for her to make her assertion. Indeed, Cher's status as a successful female pop singer is likely to ensure that this was the case. Nevertheless, what does this have to do with technology? When we see Cher performing, in all her sexualized, cosmetically modified glory, is she really the 'metaphor for what women could possibly achieve with more prestigious forms of technology' (Dickinson, 2001: 341) given that we know she

[33] Full interview found at http://www.soundonsound.com/sos/feb99/articles/tracks66.htm

had no input in the technological processes that went into the modification of her voice? Within this context, can we accept Dickinson's claim of the vocoder as a 'symbolic bridge' between perceptions of humans and machines?

In light of the above, it seems that Davis's (1997) concerns are justified - having identified Cher's exclusion from the mode of production, Dickinson (2001) chooses to ignore this by focusing on what Cher *represents* as opposed to her actual technological manipulation of her own voice. Creating a 'false' separation between the technological representations of Cher's voice from the actual practice of its technological manipulation by two male producers does not make a convincing argument for Cher's supposed technological empowerment. In reality, the incorporation of a piece of voice-manipulating technology does not reflect what Cher might actually 'mean' to the observer, which one presumes will inevitably focus on her embodied presence.

Drawing on Green's (1997: 21) concept of 'display' in musical performance helps explain why this might be so. She describes two types of display, that of 'institutional display' (recognized as an integral part of a performance on stage for example) and 'informal display' (that takes place in our everyday surroundings), and although not entirely separate, it is the notion of 'institutional display' that becomes the focus of her argument. She asserts that the way we understand display is through a gendered lens. Although sexual display may be enacted by a man or a woman she believes that, irrespective of the displayer's sex, 'the symbolic resonance of overt sexual display connote 'femininity' whereby the displayer is coded as 'feminine' and the spectator as 'masculine' (ibid: 25). This brings with it notions of the 'feminine' as reduced to a physical, 'natural', body. The body of the female instrumentalist, although still on display, is now mediated through a piece of technology. Green (1997) argues that this is why women singers are acceptable. Unlike the women musician, the singing woman's body is the source of the sound and does not require any external intervention: 'The

body is the instrument. The singing woman is, literally and metaphorically, in tune with her body' and the absence of technology 'affirms patriarchal definitions of femininity' (ibid: 28). Frith (1996: 192) makes the same observation by stating that 'the voice *is* the sound of the body'; the reason the voice is expressive of the body is precisely because it gives the listener access to it without mediation. Barthes (1977) uses the idea of the 'grain' of the voice to signify the relationship between a singer and the body – the 'grain' is the materiality of the body. Different timbral qualities have differential bodily implications and Frith (1996) suggests that the 'ungrained' voice would suggest a voice that conceals its own means of physical production. Adorno (1928) also reproduced the ideology of the singing woman as associated with the body in an early essay on the phonograph in which he claims that a woman's singing voice could not be recorded as well as a man's voice. He asserts that the former demands the physical presence of her body while the absence of a body in the latter is not considered problematic in the same way. Without a body, the female voice is 'needy and incomplete'. The male voice, however, projects a self that is identical with its sound and therefore more amenable to phonographic reproduction.

Often the coding of femininity with corporeality, invariably as 'maternal bodies', has encouraged feminists to try to move beyond what are perceived as the constraints of the body because it is seen as a 'hindrance to overcome' if women wish to attain equality and transcendence (Grosz, 1994). In an earlier article, Grosz (1993) attempts to reconceptualize the body for feminists in such a way that it cannot be charged with essentialism. She does this by arguing that this charge would be founded if one only looked at the body in the context of its patriarchal reductions of women's 'natural' passivity/maternity but not if we look at the socio-cultural conceptions of the body, which are non-reductive and non-biologistic. She sees the body as an inscriptive surface on which social law, morality and values are inscribed. She states that bodies *speak* because they become coded as signs – they *speak* social codes. This body is a carrier of social meaning – a 'semiotic body' (Lemke, 1995: 85). Therefore, like the 'real' body,

the 'cyber' body bears upon it the marks of its culture. What it looks like (handsome/ugly), its shape (fat/thin), its 'gendered' characteristics contribute to a semiotic body which can be 'read' and to which social and gendered meanings are ascribed.

This is illustrated by Bradby's (1993) description of the sampling of women's voice and bodies within the 1989 song 'Ride on Time' produced by the Italian group Black Box. The vocals had been sampled from a song by an American soul singer, Loleatta Holloway (an older, maternal-looking woman) but the video that accompanied the song showed Katherine Quinol, a younger, sexier woman 'performing' the vocals rendering Holloway's unacceptable maternal body invisible. This invisibility was reinforced by the fact that Holloway's 'contribution' (her voice) was not originally credited. Here, the technology itself is seen as producing this dichotomy as sampling involves considerable changes to the original sound so it becomes difficult to ascertain where the original recording ends and the sampled version begins. Holloway was accused of not understanding the new technology as if this were sufficient reason for not crediting her contribution. But, as Green (1997) observes it is doubtful if Quinol herself 'understood technology' either but she was not expected to as the focus was on the display of her body – the sexually, desirable body and object of the male gaze as opposed to Holloway's undesirable, maternal body. Bradby (1993: 171), while acknowledging that the separation of one woman's voice credited separately from the visual image of another female body is unacceptable, does suggests that the resultant cyborg of this technologisation may have some positive implications for women in pop music.

The 'cyborgian' female image, via Quinol's body, appears to reinforce Balsamo's (1999) concerns that female cyber-body retains its cultural markers of gender and sexuality. However, Bradby (1993: 171) suggests that, at the level of representation, this juxtaposition of the body and voice of two women may challenge what she calls 'the primacy of the *visual* in our everyday imaging of the

body (which has been central to the feminist analysis of the representation of women)'. Because the singing is now 'disembodied' and no longer rooted in a body we can see, the singing voice is now located in plural bodies so the female body can be both seen and heard differently. As she states, we are used to seeing the voice and the visual image as located in one body so the separation of this via technology means these 'cyborgian' representations of people and machines force feminists to shift between Enlightenment gender categories and postmodern theories of identity.

Loza (2001) makes a similar observation in her discussion of 'digital sound divas' in the world of electronic dance music whereby she also makes a distinction between the fluid cyborg conjured up by Haraway which she believes *can* take up an ardent feminist position and the conventionally sexed cyborg or 'fembot'. This fembot is the feminised machine that rearticulates and encapsulates sexual stereotypes and is firmly under male control. Loza describes the 'sensual sighs and simulated cries' of Donna Summer in the 'disco orgasm' 'Love to Love you Baby'. The male music producer, Giorgio Moroder, is able to control artificially Donna Summer's 'fembot' eliciting what Loza calls a 'pornosonic confession that concomitantly testified to his mastery of nascent computer technologies and female sexuality' (ibid: 351). The musical fembot continues to represent sonically a hyper-sexualised version of the female which, rather than interrogating multiple dualities (as might the political cyborg of Haraway's imagination) actually resurrects binary borders.

Alternatively, Piano (2003) describes an embodied challenge to masculine technological discourses in her work on women in the Punk music scene and their use of new technologies. She traces how feminist punks created alternative positions for themselves within an 'embodied' subculture style which led to new 'riot grrrl' movement (a political movement) that helped to enact a shift from women's subordinate position within punk subcultures from consumers or observers to that of producers. They achieved this by creating informal networks,

and the development of a high-tech DIY scene in which women had access to computers and Web software thereby placing them central to the creation of alternative spaces for cultural production by women. She notes how the feminine body became a site of contestation over meanings and identity. She argues that by participating in sub-cultural practices such as slam-dancing in the mosh pit and creating Web sites and journals, women in punk subcultures actively resisted authorial and subcultural claims that positioned women as silent bystanders. This resistance was 'enacted not only by appropriating traditionally male roles, but also by foregrounding issues of gender and sexuality through the disruptive positioning of their bodies' (ibid: 258).

As I emphasized throughout, I believe that arguments suggesting music technologies can provide the possibility for meaningful and empowering interactions for women must remain focused on the material structures in which women engage with technologies. Symbolic representations of musical cyborgs are powerful rhetorical devices but they are unable to disrupt and reconfigure the ongoing material connection between men, masculinity and technology. Unless woman genuinely have control over their technological interactions, it is difficult to see how women can claim a positive feminine identity from engaging with technologies. One important exception, I would suggest, can be found in Laurie Anderson.

The performance artist Laurie Anderson is perhaps the most convincing of all 'musical cyborgs' because she is in full control of manipulating and defining what counts as technology and music, developing new technologies and gadgets for her performances. As McClary observes:

> If her work refuses the options offered by the traditional Man-versus-Machine dichotomy, it is in part because she is not a Man. The fact that hers is a *female* body changes the dynamics of several of the oppositions

> she invokes in performance...musical space in Laurie Anderson's music is multiply charged. No longer merely a metaphorical concept, the space in which her music occurs is the arena for many kinds of cultural struggles. It is electronically saturated at the same time as it insists on the body – and not simply the neuter body that has been erased from consideration in music theory, but the problematic female body that traditionally has been the site of the spectacular.
>
> (McClary, 1991: 137-138)

As Anderson herself states:

> All of my work that deals with machines, and how they talk and think, is inherently critical. That's certainly the bias. But I think many people have missed an important fact: those songs themselves are made up of digital bits. My work is expressed through technology – a lot of it depends on 15 million watts of power.
>
> (Laurie Anderson, cited in McClary, 1991: 137).

All of Anderson's work focuses around new media and technology, from electronic opera to inventing musical instruments, merging theatre and technology, '...a theatre where technology becomes an organic extension of voice, body and space' (Jestrovic, 2000) where the borderline between the body and machine is blurred. In the performance of 'Home of the Brave' Anderson dons a suit with built-in electronic sensors that are activated as she moves – the body becoming a portable instrument. The body does not disappear in these technological mediations but enables new possibilities for resistance and creates fractures in existing power discourses. Gonçalves (2004) explores these 'strategies of resistance' through an examination of postmodern performance suggesting that during 'mediated' performance the performing body becomes a 'mediatic interface' that can be reconfigured. Gonçalves (ibid) also notes that Anderson employs different layers of mediation such as altering her voice electronically to sound like a man's or constructing a hybrid body such as with the suit described above. By incorporating different media and technology into her work, it does not

seem unreasonable to claim that she is able to 'perform resistance from within' (both physically and within the dominant discourses of technology) and challenges the 'naturalness' of the female performing body. Anderson's *conscious* construction of a hybrid technological persona can be seen as deeply political; the control exercised by her in her fusion of body, voice and machine seems to invoke a *material* 'musical cyborg' that really can reconfigure a technological feminine identity.

6.3.3 Integrating Digital and Acoustic Methods

In this final section, I will discuss the extent to which students were able to reconcile their preferred ways of working within a gendered classroom that privileged digital knowledge, technological skill and expertise. The majority of girls described their preferred working processes as involving non-digital means at certain points, often incorporating the technology after the initial ideas had been worked out, but the extent to which they were able to adopt a flexible approach was dependent on the strength of the technological discourse within each particular classroom.

Research has suggested that students' levels of formal instrumental tuition plays a significant factor in their compositional strategies. In his study of compositional process, Folkestad (1998) noted that a student's instrumental skills and prior musical training influenced the way they interacted with technology. He noticed two qualitatively different ways of creating music which he attributed to their level of instrumental skill. Those students who had received formal tuition were more likely to make what he calls 'supplementary use' of the technology. Those without such skills were likely to integrate the computer fully into the process, reacting to the possibilities of the computer rather than choosing which resources to use. Seddon and O'Neill (2003) carried out a study into computer-based compositional processes in which they explored the influence of formal instrumental music tuition through an examination of the musical activities their

participants engaged with when composing. Their findings revealed that individuals with prior experience of formal instrumental tuition tended to spend less time involved in exploratory behaviour, suggesting they experimented less with the facilities made available by the computer.

As research suggests, girls are still more likely than boys to play traditional musical instruments (Crowther and Durkin, 1982, in Comber et al, 1993) and my findings would support this. At Arts College, eight out of nine GCSE boys played either drums or guitar but only three had instrumental lessons compared to all nine girls who took lessons. A similar situation was found at New Tech Comprehensive where ten out of fifteen GCSE boys played drums or guitar whereas all six girls played piano or an orchestral instrument. At Crossways Independent and Old Tech Grammar this disparity was less noticeable but it should be pointed out that, amongst the A Level cohorts in all four schools, only one student had not had formal instrumental lessons. These observations may, in part, help to account for girls' greater interest in incorporating acoustic modes of composition. In contrast, highly proficient male instrumentalists within the GCSE and A Level groups at Old Tech Grammar stated that they never used their instrument to work things out:

CRAIG: For most of my songs, I usually have an alto sax playing the sort of leads. That's mainly what I use but I don't usually play the sax to write.
(A Level Boy, Old Tech Grammar)

**

VA: Do you ever use, I see you've got Grade 8 violin. Do you ever use your violin to compose?
STEVEN: Um, no.
VA: Why's that?
STEVEN: Don't know. I just don't do it.
(GCSE Boy, Old Tech Grammar)

Both boys chose to work directly on to the computer which supports my assertion that, due to the highly technocratic discourse produced at this school, boys' choices whether or not to engage with technology were not really an issue as these computer-mediated strategies supported their preferred ways of working.

Advocates of music technology insist that the computer itself is a highly flexible medium which can support a wide range of learning styles (Folkestad, 1998; Folkestad et al, 1998; Hickey, 1997), but rarely do they acknowledge that the gendered meanings constructed around digitally-mediated processes may lead girls and some boys to seek alternative modes of composition. Below, Dionne offers a very clear description of a song she wrote during my observations of her lessons:

> **DIONNE:** So the first thing was the German poem he gave us. The chord pattern in the second piece was I-IV-V so he just set us the task to find a love poem and write a piece. And, I went home and thought it would be nice to write for piano, it's a love song, and it's a typical lovey-dovey instrument and soprano voice so, I took the first line which was 'My Mistress' eyes' and I just came up, just hummed a melody really. I worked out the notes on the keyboard and wrote them down and just carried on from there… I chose D major 'cos it was a nice happy chord and I chose to make the song happy because at the beginning it's sounds sad but I wanted to build it up for the end, the happy end. I do modulate into the minor after I've done those 4 chords to get more tense because you think it's getting worse. In the end it goes back into major, D major to end happily and once I had the melody, I put the melody on to the computer at that point, so I could hear how it sounded, I could make the chord pattern for the right hand. The beginning's a kind of Ostinato, just a crotchet quaver thing and then the left hand, usually you have chords in the left hand but I kinda swapped it to make it, 'cos I'm a tuba player I like bass sounds so I got the, it's not really fast, 'cos it's only quaver crotchet and it kind of went from there.
>
> *(GSCE Girl, Crossways Independent)*

The culture at Crossways Independent was the least technologically oriented and the teacher was quite flexible regarding how students chose to approach their compositions. During my observations Dionne worked at a piano in a practice room only using the computer to save her ideas once they had been worked out. As Karen, also from Crossways Independent, commented about her teacher's attitude to whether or not they used computers: 'he's not really bothered I don't think, as long as we're happy with the work we come out with in the end'. She, too, was able to incorporate the piano into her working processes, only inputting her ideas on to the computer once they had been worked out acoustically:

> **KAREN:** Yeah. Um, I prefer working at the piano. I find it easier to come up with things. Like with the piano I can just find a few chords and work from there I just find it easier. Um, well the one we just did was a song. So we had to find a poem, a love poem and which rhymed and then I picked a key signature and I did the melody um first to go with the poem, because, um, yeah I added the chords that used notes of the melody. I start with a few sort of notes, melodic ideas and then um, depending on the mood I'm trying to set up I sort of, I change it to suit the mood of the piece. I just build it up using layers and stuff...
>
> *(GCSE Girl, Crossways Independent)*

This is not to suggest that females did not use technology but, like Chambers' (1993) female electroacoustic composers, their use of music technology was highly judicious and they often expressed a preference for the more 'lo-tech' end of the spectrum, which allowed them to be more in touch with the source of the sound. This places an emphasis on free exploration of the sound rather than a rule-bound approach dominated by the technological skills involved in electroacoustic composition (McCartney, 1995; 1997; 2000). In addition, the 'free exploration' is an aspect of many girls' compositional strategies when they are able to take control of their processes by incorporating acoustic alternatives:

> **VA:** What about your first idea?
> **MARY:** If I'm at school then I'll work it out on the keyboard and then sometimes I might go home and play the same thing

on the cello. I find it easier to kind of do things on the cello. I wrote a piece for cello recently. I started off with chords and then I was trying to fit a melody to it and then in the end Sir told me to improvise it because I was finding it hard to kind of plan it out so I ended up just improvising it on the cello and played it into a minidisk and found that I quite liked what I'd played and then put it on the computer... I'm working on it now.

(GCSE Girl, New Tech Comprehensive)

**

VA: So when you have the choice to use the computer or not what do you do?

LISA: I usually tend to not but if I'm on keyboard I'll use it but if I get the chance to use keyboard or piano, I'll use the piano.

VA: So do you tend to go to the piano first?

LISA: Yeah.

VA: How do you play around with your ideas?

LISA: 'Cos I have a piano at home I usually play around for a bit at home and try to remember it and then, if we have to record it on to the computer, I'll put it on computer and then play around for a while longer at home and then bring it back into school.

VA: You don't go straight to the computer?

LISA: No unless we've been told to.

(GCSE Girl, Arts College)

What was also significant was Lisa's marked delineation about the computer's role in her process. She stated she was less likely to use the computers unless specifically instructed to do so by the teacher although, from the set-up of the classroom and the observations I undertook, opportunities to work with just the piano are severely limited during lesson time. Nevertheless, she appeared able to separate the different elements of her process, keeping her 'acoustic' parts of her process confined to her out of school experiences. Lisa was one of the few girls who had managed to develop a style of composing which allowed her to satisfactorily fluctuate between having to take on a technological mantle in class while pursuing her acoustic ideas at home. She seemed able to marry them into a coherent process with very little disruption to her preferred method of working.

Nick, also a GCSE student from Arts College, appears to adopt a similar position to Lisa but Nick's comments indicate a high degree of conflict between the construction of the technologically oriented composer and his own preferred ways of working. As with New Tech Comprehensive, what it means to be a male within the Arts College classroom is circumscribed by the highly gendered approach to technological ability. For a boy at New Tech Comprehensive to admit that he was neither interested in nor very good at using technology would be very difficult as it might create a potential conflict with the type of masculinity that was valued and reproduced in this classroom:

VA:	So. you say you tend to work away from the computer as much as possible.
NICK:	Yeah.
VA:	So how did you compose your piece?
NICK:	Um. I used the guitar, just played around with it and see what comes out.
VA:	So, is it recorded somewhere?
NICK:	No. It's all in my head.

(GCSE Boy, New Tech Comprehensive)

This was somewhat contradicted by the observations I undertook in which Nick always worked with the computer and keyboard. Despite his assertion that he could choose when to include technology into the process, his use of it was as heavily circumscribed as that of the other students and, like Lisa, it was only at home that he was able to exercise a degree of agency into the process.

It should be noted that none of the girls cited in this discussion came from Old Tech Grammar. I could find no examples of either boys or girls composing anywhere other than the music technology suite or using acoustic instruments, unlike at Crossways Independent, and, on a few occasions, New Tech Comprehensive. Although there was a fully-equipped room immediately next door (in which the register was always taken before the lesson began) with

keyboards and headphones, the students were always directed into the suite, and, as I outlined earlier, this often proved a difficult environment for female students.

6.4 Conclusion

In my examination of the compositional stimulus as provided by the teacher in response to curriculum demands, I highlighted how teachers' normative constructions of masculinity and femininity played a large part in the degree to which students were either supported or not in the degree to which they deviated from the set tasks. While boys' deviance was admired and encouraged for its perceived 'flair' and 'creativity', girls' deviance was configured rather differently in accordance with cultural assumptions about femininity and conformity.

In my examination of the composition process, it would appear that, despite the implicit assumption that music technology provides an egalitarian backdrop to composition, the ongoing masculine connotations associated with technology remain intact. This produces an environment which reinforces traditional notions of masculinity and, particularly at Arts College, New Tech Comprehensive and Old Tech Grammar, encourages a technologically-focussed approach to technology which may not be as conducive to girls' working processes as those of boys. I discussed how girls were likely to be more judicious in their use of technology noting that they were happy to use technology but expressed reluctance to use it for the whole of the compositional process. The discourse of masculinity was very strong at Old Tech Grammar, Arts College and New Tech Comprehensive and clearly boys were willing, able and encouraged to participate in the construction of this discourse. Although this presents difficulties for girls in the classroom, I would suggest that such a strongly circumscribed approach to the use of technology is not unproblematic for some boys too although they appear to have access to other acceptable forms of masculinity, such as Nick at Arts College, that was not available to the girls.

This discussion was foregrounded by an examination of Haraway's (1990) cyborg metaphor and its appropriation by feminist musicologists in an attempt to reconfigure how we think about the relationship between humans and machines. However, some feminists have appropriated the apparently 'utopian' aspects of the cyborg in an uncritical way that suggests that the inevitability of women's assimilation into the technological world is assured. This position plays into the hands of the technocracts and determinists who would have people believe that to be out of the technological loop marks them out as inferior and incompetent compared to their technologically-skilled peers; rhetoric which plays on people's fears that they might 'end up on the wrong side of the technologically polarizing world' (Valentine and Holloway, 2001: 61).

The need to encourage women to engage with technology is not being questioned here; women must have opportunities to use and develop their technological capabilities. What is of concern is the disconnection of this new 'cyborg citizen' from the material social world. The cyborg's symbolic representation as a cultural icon invariably leaves unequal gendered social relations intact and I suggested that these representations were unhelpful in developing a material understanding of women's position in the digital domain. New digital technologies are entwined in all aspects of social, cultural and political life and are therefore encumbered with the materiality of gendered social structures and issues of power (who has the power to dictate what technologies are developed, how they are developed and for what purposes, for example). I believe these issues should remain fundamental to current discussions about gender and technology adopting what Woolgar (2002:4) sensibly calls a 'sceptical awareness' in analyses of new digital technology. Uncritically embracing the march of technology will change neither the material nor cultural constraints that women face in their actual experiences of the technological world. The elusive *rhetorical* cyborg is not the solution, but women's *material* ability to take control of and make choices about their technological engagement does have the potential to

influence gender-technology relations.

Technological discourses invoke an ideology about the masculine mind behind technological skill. Therefore, to compose with technology further emphasizes cerebral power. Green (1997) argues that the more technology is involved the greater the masculine delineation, therefore for females to engage with it conflicts with the patriarchal construction of femininity. Whereas engaging with technology is affirmatory of masculinity, girls' engagement with it marks an interruption to their femininity because technological expertise is not part of feminine identity. Technology and music composition can therefore be seen as both a form of knowledge and a social process, controlled and managed within specific structures (Faulkner and Arnold, 1985); within the music classroom, these construct the technological user (as described in Chapter 5) and circumscribe compositional processes.

CHAPTER 7: SUMMARY OF FINDINGS AND IMPLICATIONS FOR CLASSROOM PRACTICE

7.1 Introduction

In this concluding chapter, I return to my original research focus and précis what motivated it and how it has been addressed. I then summarise the main findings and issues that have been raised, offering some suggestions for classroom practice in light of the above. Finally, I reflect on the limitations of the empirical work, including some areas that were not explored, and suggest some possible directions that could be examined in future research.

This study carried out a critical examination of the processes and practices by which technologies become gendered as they relate to music technology and composition. The thesis holds that all technology is socially embedded and, as such, is constituted through social relations that produce gendered meanings around technological use and technological artefacts. Men have more power to decide what counts as technology and this has implications both for society at large and, more specifically, for the music classroom. The processes by which this happens mirrors women's experiences, socially and historically, as composers, and it seemed pertinent, given the prevalence of music technology in contemporary music classrooms, to examine how gendered discourses are produced in this educational setting. As such, it is necessary to examine gender 'as an integral part of the social shaping of technology' (Faulkner, 2001:90).

The motivation for this study was a response to what I perceived as a strong deterministic trend in the recent music education literature that ignores the socially constructed nature of computers and computer use. Most current debates focus on pedagogical issues and educational outcomes (Folkestad et al, 1998; Hickey, 1997; Mills and Murray, 2000; Savage and Challis, 2001) that leave aside the socio-cultural context of technology's use. Hitherto, discussions of

technology in music education have not engaged with wider technological social theory and I believe this has led music educators and researchers to unwittingly reproduce technological determinist discourses which reinforce existing gender-technology relations found within other socio-cultural contexts. The orthodoxy of technological determinism, despite its obvious neglect of social context, remains enormously powerful in constructing 'common sense' assumptions about children and ICT as many Government educational directives indicate. These technocratic discussions produce an 'ideal' child user who is confident and eager to engage with all forms of technology; this suggests a 'natural' affinity between children and technology that has not gone unchallenged (Facer et al, 2001; Facer et al, 2003; Holloway and Valentine, 2003).

In spite of these concerns, the Department for Education and Skills (DfES) states that schools will become centres of excellence in the use of ICT to enable all children to achieve their full potential; children are described as 'missionaries' leading a 'children's crusade' in the Information and Technology Revolution (Kenneth Baker, 1983, cited by Haddon and Skinner, 1991: 438). But this produces educational discourses that appear to decontextualise technology from any form of social context. One of the key concepts I have employed throughout this thesis is that technology is socially embedded and this has helped illustrate the socially constructed nature of computers and computer use. Contrary to the orthodoxy of technological determinism, central to my argument is that technology forms part of a relationship creating complex connections with other social relations and institutions (Williams, 1981). As such, this focuses my discussion on the dialectical relationship between technology and society as mutually constitutive, both shaping and being shaped within social settings.

Consequently, the specific contributions that this study hopes to make to the field of music education are twofold. The first is designed to redress a perceived lack of critical discussion within the technology in music education literature, which has failed to engage with the well-established field of the sociology of technology

studies. This large body of work has powerfully shown how technologies are shaped by the social relations of the worlds they enter. Secondly, it engages in a critical discussion about the nature of technological use in the music classroom via an in-depth socio-cultural examination of the processes by which material and symbolic masculinity continues to inform notions of gender identity and gendered musical practices as they relate to composition. It thereby offers an original perspective to the field of music education that stands as a corrective to the uncritical, technocratic discourses that are currently in circulation. Unlike other studies in the field of music education, by drawing heavily on the sociology of technology studies literature, I have been able to provide a more sophisticated theoretical context for examining the articulation between masculinity and technology and its contribution to gendered social relations that attempts to deconstruct the 'inevitability' of music education technologies. The body of work that constitutes the sociology of technology studies powerfully illustrates that continuing material and symbolic associations of technology with men and masculinity constructs women as less able and less interested in technology. This study confirms that we cannot escape the socially constructed nature of technology; to ignore the gendered social relations surrounding its use only serves to perpetuate myths about men and masculinity's symbolic and material connection with technology. However, it is perhaps important to note that while this study does highlight gender differences, I do not suggest that simple boy-girl distinctions in attitudes and use are appropriate but that the culture of the music technology classroom reproduces an ideology of male expertise where girls (and some non-technological boys) may often find themselves marginalized.

7.2 Developing Strategies for Feminist Praxis

Given the feminist nature of this study, I will summarise my findings within the context of their implications for young composers and offer some recommendations for feminist praxis within the music technology classroom.

7.2.1 Access, Equality and Training

I have viewed the classroom as an established culture in which teachers and pupils share expectations about the setting: what is valued, taught and learned and how this is socially organized (Sheingold et al, 1984). As I asserted, technology and composition become gendered through certain practices and processes and I have shown, in Chapter 4, how this occurs drawing on a range of settings including the home, workplace and classroom.

I have suggested that girls expressed far lower levels of confidence in their technological abilities, findings which support and affirm the conclusions of other researchers (Comber et al, 1993; Caputo, 1994; Colley et al 1997; Green, 1997), particularly in co-educational settings. This has led researchers to suggest that girls need more structured help and training with new music software programs (Colley et al, 1997) possibly in single-sex settings. However, as Culley (1988) has noted, there may be a tendency to 'ghettoise' girls-only sessions that are taught by staff who are themselves not perceived as particularly technologically proficient and this clearly has serious implications for classroom practice. 'Girls-only' schemes are only partly successful because they further diminish girls' access and because the 'open' sessions become dominated by boys. Cully also asserts that one of the reasons girls are less inclined to use the computer rooms is because the culture is predominantly male. Nevertheless, providing separate facilities for girls will not affect the prevailing culture; by removing them there is a serious risk of producing a subordinate female subculture in which 'female technology' might be unfairly compared to 'male technology'. As my research demonstrates, girls do need extra support but perhaps, rather than instituting separate sessions for girls, it might be possible for teachers to give girls this extra support while also challenging perceptions about 'male expertise'. This is perhaps the most desirable scenario when we examine the perceptions of teachers as believing that boys are more interested and capable at using computers while the girls are perceived as having less 'flair' for computing. These differential

expectations can also have a significant impact on boys' and girls' levels of confidence and attainment.

Furthermore, a significant number of the girls within my study stated that they had not been given the same training in certain types of software, such as the situation I observed at Old Tech Grammar, where very few female GCSE students had any significant knowledge of sequencing packages compared to the large number of the boys who appeared to be able to use these packages. The boys had been given 'ad hoc' tuition via one of the teachers that was not made available to the female members of the group further perpetuating gendered notions of skill and know-how. This situation was similar across different sites.

7.2.2 Role Models and Mentors

Throughout this study, I have illustrated how the role of the teacher has played an important part in constructing gendered technological discourses. I have argued that men's symbolic association with technology is an important aspect in constructions of masculinity and my study demonstrates that male teachers and pupils positively align themselves with all things technological. This affords them greater control to name what counts and who counts in technological spaces and who can be constructed as the technological expert. Game and Pringle (1984) state that men have more power to say what they will and will not do and consequently have a greater influence over the cultural and material practices within the workplace. Men's experiences feed into pre-existing masculine cultures from which women are already excluded. In addition to these formal male networks are those informal networks around which 'masculine' cultures develop (Tiernay, 1995; Green *et al* 1993). Few women either wish to or are able to participate in them and are thereby left out of an important part of the loop.

As Lamb (1993: 175) observes 'it becomes apparent that men, as a class, define the structures of power and maintain the relations of ruling within music and

music education'. This in turn impacts negatively on pupils' perceptions of female teachers. Female teachers are considered less interested and less able to engage with music composition technologies. Where they do so, their engagement is perceived as requiring very little skill or technical expertise, such as printing off parts for rehearsals. This has a significant impact on how male teachers and pupils work together to produced gendered discourses to which female teachers and pupils find themselves unable to contribute. Pupils' perceptions will be significantly influenced by the sex of the teacher to act as a role-model (Green, 1997: 242). It is therefore important for teachers to begin to develop a self-awareness as to how their social interactions around technology are perceived. As I demonstrated in my discussion of the construction of the pupil expert, female teachers can often undermine not only their own authority and identity but also that of their female pupils when they insist on privileging boys' technical knowledge over that of girls. Male teachers should attempt to encourage girls to participate in technological discussions that are often monopolized by boys thereby indicating that their knowledge is equally valued.

Using older girls to mentor younger girls and boys may also reduce the masculine connotations of computers and music software. If girls are seen to talk about and use technology knowledgeably and confidently, the symbolic associations of technology with masculinity could perhaps be minimized. In addition, this would also help the older girls who, as I have shown, often appear reluctant to engage with complex technologies such as sequencing packages because of their 'masculine' connotations. Encouraging more confident technological girls to work with less confident girls during composition lessons may also alter perceptions about girls' technological competence. Female role models are important to other women as the following comment by a female MA student in Audio Production highlights:

> The few female teachers that I have encountered during my four years in music/technology education have been tremendous role models for me.

> I don't think they were trying to be role models. It is often enough that they are there.
>
> (Whistlecroft, 2000: 5)

7.2.3 Flexible Processes and Affirmatory Identities

While Haraway's cyborg as a concept for feminist analysis continues to stimulate our imaginations, as a political image I have suggested that it has been less successful. Indeed, the use of metaphor allows us to conceive of an emancipation of knowledge in which women can share in the making of discourses which have for so long excluded them. As Squires notes, persuasive rhetoric alone will not be sufficient to alter the distribution of power. Like many feminists, she does not deny the usefulness of the cyborg image but feels that it has been 'submerged beneath a sea of technophoric cyberdrool' (2000: 360). She rightly asserts that the image of the cyborg can only be salvaged if it is seen 'as a metaphor for addressing the interrelation between technology and the body, not as a means of using the former to transcend the latter' (ibid: 360). This observation highlights the tensions between cyberfeminists, who have seized on the cyborg as the ontological future and those feminists, and here I include myself, who wish to see the body included in discussions about technology. Without this sense of the corporeal, we are in danger of losing the political plot. Whatever the acts of 'cyborgian' engagement envisioned by Haraway, these are all initiated from the corporeal and it is this that grounds us in real, lived, social relations. The idea that the materiality of our existence could and/or should be extinguished seems to be a frantic attempt to align us with all things technological, as if our 'cyborgian' selves were entirely transcendent of material concerns. Rather worryingly, it further suggests that the corporeal (and here I am referring to both men's and women's bodies) can be re-drawn *at will* via a new technological embodiment which transcends (or ignores) cultural markers or by attempting to obliterate the body completely. Neither of these formulations appears satisfactory because

notions of identity become completely divorced from our real, lived, social relations.

My findings suggest that the meanings around music software are also highly gendered and this could also be addressed in a similar manner. Certain types of software may be more compatible with and reflect gendered assumptions about the user. The more complicated a music program was perceived the more it was likely to be associated with a male expert user whereas notational software was regarded as simpler and easier to use and boys (and some girls) were less likely to associate this software with 'real' music technology. My findings also suggest that boys are secure in their identity as computer users which in part was associated with the ability to use more complex music software and its association with masculine characteristics of skill and expertise. Masculinity is often characterized by notions of technological skill, know-how and expertise and, as Green (1997) has argued, this also underpins the gendered discourse of music composition. The more complicated the program the more likely it was to be used by boys; although both boys and girls use notational software, many of the boys do not see it as 'proper' music technology because of its perceived 'simplicity'. Furthermore, where there was an 'ad hoc' approach as to which programs students were exposed to, boys were usually the recipients of more 'complex' technological information and teachers were more likely to introduce boys to more advanced sequencing software, as was the case with the GCSE class at Old Tech Grammar.

I showed how boys and male teachers were constructed as the technological experts and I argued that this was linked to issues of control, mastery and skill - aspects of hegemonic masculine identity (Connell, 1995) that were particularly prized at New Tech Comprehensive, Old Tech Grammar and to a slightly lesser degree at Arts College. Even Crossways Independent, despite not being implicated in this gendered technological discourse, participated in a strongly gendered musical discourse that privileged a certain type of compositional

identity. An identity grounded within the normative expectations of the 'genius' (Battersby, 1989) composer that gave greater autonomy, physical and creative freedom to the male students. Being a boy and 'doing boy' within these three specific cultural sites was certainly bound up with an affirmatory technological identity. Even where females exhibited equivalent expertise (such as the female teacher at Old Tech Grammar), boys' perceptions of female technological competence was down-graded and often went unacknowledged. Through discourse and social interaction, females are produced as outsiders within these technological cultures although, as I have argued, they do find spaces to construct a 'technological' identity, such as in the home, away from the male gaze of potential failure. These gendered discourses of technology feed into the ways in which boys and girls engage with technology and ascribe meaning to it.

Boys' engagement with technology is symbolized as being technically skilled, taking control and mastering new technologies; girls, however, are not positioned in this way and are often considered less technologically competent and unskilled. Boys are more likely to construct an affirmatory masculine identity whereas girls were unable to construct a similarly affirmatory identity. I suggested that this led to a style of working that favoured boys rather than girls and one way of circumventing these masculine styles of working was to incorporate acoustic instruments into the process. In light of these findings, I would suggest that teachers, where possible, do not equate 'composition' with 'music technology suite'. If other modes of composition are available, students should be offered the opportunity to use these rather than compel all students to compose in the same way.

7.3 Limitations of the Research

In this thesis, the methods I employed took on an ethnographic hue in that I wanted to develop as rich an understanding as I could of each school. Therefore, I attended concerts and hung around music technology suites during school lunch-

hours in addition to my classroom observations. However, given the time constraints placed upon me, I only undertook three observations in each class. Ideally, I would have liked to carry out more observations and they would have been carried out over a long period if my work situation had permitted. Consequently, my data are drawn from a relatively small number of observations from which to develop my analysis.

Two themes emerged from that data that I had not anticipated because they had not arisen during the pilot study. The first was the theme of the home as an important site for students' learning and compositional processes. Given the parameters of this study, it was clearly not possible to observe my respondents working in the home. Therefore, my findings, although verifiable within the parameters of the individual interviews, are based on respondents' comments about what they do but could not be triangulated in the same way through use of classroom observations.

Secondly, the theme of musical genre has not been addressed although I am aware that this is a fertile area to investigate with regard to young peoples' compositional practices. However, as I was not looking at the actual musical product and the outcomes of the compositional process, it seemed appropriate not to enter into that discussion. It also seemed a somewhat fruitless task because, as I discussed in detail, the prescriptions of the music syllabus invariably provide the compositional remit for the cohorts I was observing. I would suggest that an understanding of young peoples' preferences for musical genre with regard to computer-mediated composition might be a more worthwhile area of research in informal music-making settings.

7.4 Possibilities for Future Research

However, these omissions suggest a number of possible areas for future research in gender and music technology. Firstly, with regard to young peoples' informal

compositional practices. It has been noted that as many as one third of children actively compose outside the classroom as part of their everyday lives (Paterson and Odam, 2000 cited in Bunting, 2002b). My brief discussion in Chapter 6 touched upon this aspect of adolescents' composition practices and, in Chapter 5, I discussed how this seemed especially pertinent to the experiences of the girls within this study who developed technological expertise within this 'safe' out-of-school space. Out of school, technologically mediated composition is an under-explored area of music education research and yet, many of the concerns that underpin this thesis have fuelled the growing interest in young people and their out of school uses of computers in recent years. Many are sceptical of the claims made about children's actual practices with digital technologies and, more recently, a number of empirically based studies have appeared that examine how children employ ICT within the context of their everyday lives (Facer et al, 2003; Holloway and Valentine, 2003; Hutchby and Moran-Ellis, 2001; Sefton-Green, 1998). Within music education, however, there appears to be limited interest in young people and their out of school music practices, with the exception of a handful of studies. These include Green's (2001) study of the informal learning practices in the development of popular musicians' instrumental skills, Campbell's (1998) work with young children and Jaffurs' (2004) ethnographic investigation into the music making practices of a student rock group. Green's (2001) research examines how informal instrumental learning might inform the work of formal musical educators in the classroom and argues that more significance should be given to pupils' own notions of value and preference in music. This mirrors some of the emergent themes discussed in Chapter 6. Young people do have access to compositional software at home and the ways in which they report using it in that context is often markedly different from the way it is employed at school, therefore the study of compositional practices in and out-of-school situations seems a fruitful area for future research. An empirically based study could help develop an understanding of how these informal compositional activities and the computer expertise developed in and out-of-school contexts could feed back into the school setting and could be carried out using a range of

research tools including interviews, home visits, asking participants to video their technological interactions together with using software that can capture the compositional process. Perhaps, given some of the problems young people experience when working within the prescriptions of the music syllabus and pre-determined musical stimuli (Chapter 6), it might be pertinent to ask if all classroom composition is educationally valuable and relevant to lives of young people. Therefore, a greater understanding and acknowledgement of their informal compositional practices might make classroom music seem more relevant to the lives of many young musicians.

Secondly, as I mentioned above, an empirical investigation into genre preferences might enable music educators and policy makers to re-assess their insistence on giving prescriptive musical briefs that many students cannot identify with, feel no ownership of and are not meaningful to them on a subjective level.

Finally, it might prove fruitful to carry out a longitudinal study from primary through to secondary to understand why girls' levels of interest and engagement diminish as they reach maturity. As yet, research such as Comber et al's (1993) is speculative rather than empirically based and it might enable music educators to develop a greater awareness of the problems that young girls face as they progress through school. It may also help us develop early interventionist strategies rather than waiting until students reach adolescence by which time many cultural assumptions about gender are firmly entrenched.

There could also be the possibility of a longitudinal study at the opposite end of the educational spectrum. Whistlecroft (2000) has highlighted the dearth of female music technology lecturers in Higher Education and one imagines that the processes and practices that this thesis has uncovered also contribute to women's invisibility within technological spaces at this level. Therefore, an empirical study perhaps tracking postgraduate female music technologists might help us

understand the barriers they might face and the reasons why they may deliberately choose not to seek employment in Higher Education.

7.5 Conclusion

My contention is that boys and girls have agency to choose what subject positions they adopt but I have argued that this is within a particular cultural and structural context. Therefore, the degree to which this is possible is circumscribed by the classroom cultures in which they operate. It would appear, from my findings, that although girls do find spaces to develop a technological and compositional identity, this is made particularly difficult in cultures that produce an overt technological discourse in which girls and women are rendered invisible and silent.

While it is apparent that compositional music technology has significant practical benefits for many, my findings highlight that we must not lose sight of the socio-cultural aspects of computers and their use in which gender-technology relations are constituted. Despite arguments for technology's 'democratizing' potential, it appears that there are gender differences, not in any innate, essentializing way, but differences produced through the reproduction of gendered understandings of technology within society. These differences are produced through discourses that posit boys and male teachers as the technological experts. Boys are given greater compositional autonomy and this appears to feed into continuing notions of the male 'genius' (Battersby, 1989). Forms of musical deviance in boys are more likely to be tolerated by their teachers which may, in turn, be a significant factor in their display of higher levels of confidence as technologists and composers than their female counterparts.

The relationship between gender and music technology should remain an important empirical question for music educators when thinking about compositional practices mediated via technology. If girls are also to have positive

experiences of composition and technology, music educators must be mindful of difference and plurality. Gender equity within the technologised music classroom goes far beyond issues of equal access. It comes through an awareness of how language, behaviour, values, organizational issues, texts, music software and knowledge all contribute to the shaping of gendered meanings that enter into our classroom practices and reproduce normative gendered expectations. This is especially pertinent given that music technology is becoming increasingly central to music-making practices in educational settings across all sectors of education from Primary to Higher education.

Gould (2004: 73) observes that 'feminism has received the dubious distinction of being responsible for the contamination of both music and music education' leading musicologists to assert that 'many of us are suffering from battle fatigue: weary of politics and touched by nostalgia, we long for a time when we can return to the tasks of making music – purely, simply and undisturbed' (Miles, 1999: 10, cited by Gould, 1994). However, this is a position that women have rarely found themselves in – there is nothing 'simple' or 'undisturbed' about women's engagement with composition and technology. It is a constant battle for recognition, of negotiation and for the affirmation of self and identity that we would do well to remember in our uncritical embracing of technology. I will end with a short extract from my conversation with Carolyn, an enthusiastic, curious young composer whose poignant words so eloquently summarize so many of the themes I have dealt with:

CAROLYN: I love composing when I'm allowed to sit down and write completely what I want but when you've got to think 'oh, it's got to have this technique' or make sure that you're showing you can do 'this' and it's got to be done by such and such a time, you kind of get bogged down in the kind of mathematics of it instead of the creative side and I think that's a bit of shame, because that's the part I enjoy.

VA: So how did you feel about the composition you've written? Are they less satisfying when you are given a stimulus?

CAROLYN: I wouldn't say less satisfying because you're always sort of proud of yourself when you come away with a composition that sounds good…you can say 'I've done that'…but then there's not so much emotional attachment to the piece. I suppose that's a bit of a shame because that's what music is about for me.

(A Level Girl, Crossways Independent)

GLOSSARY OF MUSIC SOFTWARE

CAKEWALK	Recording Software; a very simple multi-track recorder.
COOL EDIT PRO	For Digital Audio Recording with built-in editing and mixing facilities; not a sequencer
CUBASE VST	An integrated music sequencing package for recording, editing and processing MIDI and audio material; acts like a 'virtual' recording studio inside the computer.
FRUITYLOOPS	Allows you to compose your own loops using drum machines and synthesizers; can import samples in WAV format from other sources; ideal for trance, techno and house music (forms of electronic dance music)[34]
LOGIC	Combines MIDI sequencer, audio recorder and music notation; often the software of choice for professional musicians/composers.
MIDI	Musical Instrument Digital Interface: digital language which enables the communication and storage of performance and controller data
MUSIC TIME DELUXE	A simple-to-use score editor with some basic sequencing; notes are entered via the mouse or computer keyboard; good for small ensembles and Guitar + Text scores.
REASON	A virtual music studio that replicates a hardware rack setup of a traditional sound engineer. Has mixing desk, effects units, loop players, drum machines
SIBELIUS	A score-writing notational package; the interface is straight forward and intuitive; provides good presentation of scores.
SOUND FORGE	Digital Audio Editing software for recording and manipulating audio; sounds recorded straight into computer; acts like a mini-recording studio.

[34] See www.jahsonic.com for an historical overview of these forms of dance music and audio examples.

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Appendix 1: Student Information Questionnaire

A. GENERAL

i) Name: .....
ii) School: .....
iii) Age: .....
iv) Course & Year:.....

B. MUSICAL BACKGROUND

i) What instrument/s do you play (including singing)?
.....
ii) If you have taken exams in any of the above, what grade(s) have you achieved?: .....
iii) Do you read music notation?.....

C. MUSICAL ACTIVITIES

i) What musical activities do you take part in AT SCHOOL(e.g. choir, orchestra)?.....
.....

ii) What musical activities do you take part in OUTSIDE of school? .....
.....
iii) If you play in a band what type is it and do you play/sing/write/write lyrics? .....
.....

D. MUSIC TECHNOLOGY

i) Do you have a computer at home?.....

ii) If the answer is YES, does it contain any COMPOSITIONAL music software e.g. Cubase, Sibelius .....
.....

iii) If you use this Music Technology AT HOME, estimate how much time you spend using it per week?.....

iv) If you have COMPOSITIONAL music software at home, what do you use it for, (e.g. coursework, other types of composition)? .....

...

.....

iv) If you use Music Technology AT SCHOOL estimate how much time you spend using it per week .....

vi) Do you feel confident using Music Technology for Composing?.....

vii) If your answer is NO, what would help you gain confidence in using it?

.....

.....

.....

viii) If your answer is YES, what aspects do you feel you are particularly good at?

.....

.....

.....

ix) Who is the best person in your class at using the Music Technology?

.....

Appendix 2: PUPIL SEMI-STRUCTURED INTERVIEW QUESTIONS

Confidence, Learning about ICT, Likes & Dislikes

- What types of software do you use at school (and at home if they have answered 'Yes' to having access to music software for composing at home on the questionnaire).
- Were you taught how to use the software in classroom lessons?
- Are you confident at using technology?
- What kinds of things would increase your confidence?
- Do you get enough help from teachers on technical aspects in class?
- Do you like using Music Tech? Good and bad points
- Do you have a preference for any particular type of software and why?
- When you encounter technical problems, who do you ask for help?

Technological Expertise

- Get respondent to elaborate on why they nominated a particular person as their 'technological expert' (from questionnaire).
- Who is the best teacher in the department at using music technology?
- In your class, who is better at using Tech, boys or girls? Why?

The Compositional Process and being a composer

- Do you like composing?
- What aspects do you like or dislike about composing
- Would you call yourself 'a composer?'
- Function/purpose of composing (e.g self-expression, meaing) i.e. why do you compose?
- How do you compose – what do you start with, how do you develop ideas?
- Based on the composition that they were working on during observations, ask pupil to describe the process in as much detail as possible.
- When do you use music technology for composing? (planning, developing, inputting?)
- To what extent are you expected to work with computers? Is there any possibility to write away from computers using live players or your own instrument? Is this encouraged/discouraged?
- To what extent do you plan your compositions?
- If things don't go according to plan, to what extent to you let things happen or change things?

Stimulus

- Generation of initial idea (your own? The teacher's stimulus?)
- To what extent to you stick to a given idea.
- Do you prefer your own idea or do you prefer to have one given you and why.

Appendix 3: TEACHER SEMI-STRUCTURED INTERVIEW QUESTIONS

- How long has the school been using Music Technology?
- What training have you received in using it?
- Are all the teachers trained in using it?
- When you encounter technical problems who deals with them?
- What types of software do you use at the school?
- What do you think are the benefits/drawbacks of using Music Technology for composing?
- Since the introduction of technology, what changes if any have you noticed in the way students compose? And are there any gender differences?
- How do you deal with students who don't feel comfortable using technology or don't want to use it? What practical support is offered to them?

Appendix 4: CODING CATEGORIES

CASE DATA

School
Pupil Gender
Teacher Gender
A Level Class
GCSE Class

SOCIAL/STRUCTURAL

Teacher/Pupil Interaction
Pupil/Pupil Interaction
Teacher/Teacher Interaction
Recording Studio
Designated Music Technology Suite
Music Classroom
Home
Practice Room

ACTIVITY CODES

Working at Piano
Working with another Acoustic Instrument
Working at Computer
Working at Electronic Keyboard
Working alone
Working in groups/pairs
'Doing nothing'
Playing Instrument
Working with chords
Writing a melody
Notating
Writing out score
Playing from score acoustically
Playing back score on computer

TYPES OF TALK
('technological talk' defined as associated with digital technology)

Technological talk about training
Technological talk about learning about technology

Technological talk about using technology (problems/questions)
Specifically about the software
Non-technological talk about musical materials
Non-technological talk about musical structure
Associated with exams/coursework

SUBJECTIVE

What pupils like about music technology
What pupils dislike about music technology
Pupils' attitudes to composition
Pupils' attitudes to composing with computers
Sharing Technological Knowledge
Controlling Technological Knowledge
Self-Expression
Ownership
Confidence
Technological Competence
The Researcher's reflexive position

COMPOSING

Compositional Stimulus
Planning
Developing the piece
Compositional Process
Improvising
As related to specific instruments
As related to specific software
Genre

GENERAL THEMES

The Body
Teachers' perceptions of pupils
Equality/Access
Deviance
Conformity